INPUT®

C0065

Federal Information Systems and
Services Program (FISSP)

Federal Government
Professional Services Market

Contents

FEDERAL GOVERNMENT PROFESSIONAL SERVICES MARKET

**Federal Information Systems and Services
Program (FISSP)**

Federal Government Professional Services Market

Abstract

INPUT believes that the federal market demand for professional services will sustain a 13% average annual growth rate in the 1987-1992 forecast period. This market is now expected to increase from $3.6 billion in 1987 to $6.2 billion by 1992.

The federal professional services market will continue to remain highly competitive with increasing pressure from small business and minority-owned firms as well as aerospace firms. In addition, the market continues to be highly price sensitive, with progressively narrower margins and more tightly controlled overhead. This report analyzes agency plans for future use of professional services. It also discusses vendor status, future market plans, and selection criteria; vendor performance characteristics; contracting policy and preference; and major contract opportunities in this period.

This report now contains 158 pages, including 55 Exhibits, and is an update of the report of the same title.

Table of Contents

Table of Contents (Continued)

Table of Contents (Continued)

Table of Contents (Continued)

Exhibits

Exhibits (Continued)

Exhibits (Continued)

I

Introduction

This revised report on computer-related professional services provided to the federal government was prepared as a part of the Federal Information Systems and Services Program (FISSP). Research for this report is based upon an analysis of the INPUT Procurement Analysis Reports, previous INPUT research conducted for earlier reports, discussions with FISSP clients, interviews with federal government agencies, and interviews with vendors of professional services that market to the federal government.

A
Scope

This revised report covers those professional services programs listed in the OMB/GSA/NBS Five-Year Plan for government fiscal years (GFYs) 1988 to 1992, related federal agency long-range Information Resources Management (IRM) plans, and federal agency GFY 1987 and 1988 Information Technology Budgets. The agencies selected for interview were identified in one or more of the above plans as current users of professional services.

The vendors selected for interview were identified as contractors of record for ongoing programs or listed as vendors for federal government professional services in INPUT's Company Analysis and Monitoring Service data base for 1987. The period of interest is GFY 1987 to 1992.

B
Methodology

The OMB/GSA/NBS Five-Year Plan analysis for the INPUT Procurement Analysis Report was reviewed for programs to be initiated during the period of interest. The available agency Long-Range ADP Plans for GFY 1987-1991 and GFY 1988-1992 were researched to identify plans for major professional services contracts.

The Federal Government Information Technology Budget requests provided in response to OMB Circular A-11, Sections 43A and 43B, for GFY 1986 to 1988 were analyzed to identify significant spending changes and both leading and lagging agencies for interviews. Question-

naires were developed for interviews with both federal agency officials and professional services vendor executives. Questionnaires were developed for interviews with both federal agency officials and professional services vendor executives.

- Federal agency officials selected for interview included:

  - Executives (policy)
  - Contracting officers (buyers)
  - Program managers (users)

- Vendor executives selected for interview included:

  - Company executives
  - Marketing executives

Copies of the agency and vendor (industry) questionnaires are included in Appendices F and G.

- The agency questionnaire was designed to acquire information about current experience and plans for future use of professional services.

- The vendor questionnaire was designed to acquire information on industry status and future federal market plans.

- Both included similar questions about contracting policy and preference, selection criteria, and vendor performance characteristics for comparison.

The current versions of the Federal Information Resource Management Regulations, Federal Acquisition Regulations, Defense Acquisition Regulation (changes to FAR), and Multiple Agreement Schedule policy were investigated to identify changes that will impact professional services contracts and/or contract performance. Releases from the OBM Federal Contract Reporting Center were also reviewed to identify contract sizes, duration, and modification trends and to aid in assessing market shares.

C
Report Organization

This report has been organized into the following sections:

- Executive Overview
- Market Analysis and Forecast
- Federal User Requirements and Trends
- Professional Services Competitive Trends
- Professional Services Opportunities

Several appendices are provided to aid in report use:

- Interview Profiles
- Definitions
- Glossary of Federal Acronyms
- Related INPUT reports
- Questionnaires

II

Executive Overview

A
Federal Market Pressures

The federal market for information technology professional services is expected to continue to grow over the next five years. Some of the pressures driving this growth are listed in Exhibit II-1. Government programs require steady improvement in both the quality and quantity of information technology support.

In its drive to improve productivity, to do more with less, the federal government is growing increasingly reliant on information technology. At the same time, functional and pricing trends, especially in terms of microcomputers and associated software, have opened up new opportunities in government for using the technology.

EXHIBIT II-1

FEDERAL MARKET PRESSURES

- Improve Information Technology Support

- Improve Productivity

- Maintain and Enhance Systems

- Increase Contracting Out

- Overcome Staff Shortages

Agencies continue a heavy commitment to maintain and enhance existing systems, as well as developing new systems. However, staff shortages effectively prevent in-house performance of these tasks. Further, pressure to reduce the federal budget deficit increases the importance of efficiency and innovation.

However, the Reagan administration has encouraged the contracting out of many formerly in-house activities, including professional services. The growing emphasis on OMB Circular A-76, as well as the new Executive Order 12615 ("Performance of Commercial Activities"), emphasizes the bias toward contracting out. At an increasing rate, agencies must use professional services firms to take advantage of the technology and reach their productivity goals.

Federal personnel policies are also driving an increase in the use of professional services firms. Practically all agency executives that INPUT interviewed cited difficulty in hiring staff with strong technical credentials. In the Washington area, at least, good candidates can frequently obtain higher salaries and better benefits in the private sector than in the government. Thus, many employees with fewer than 15 years of service are leaving government. Agency executives, usually with more than 20 years of service and looking toward retirement, must contract out most of their technical support activities.

B
Market Forecast

INPUT estimates that the federal professional services market will increase from $3.6 billion in FY 1987 to $6.2 billion by 1992, an average annual growth rate of 13%. Exhibit II-2 displays a breakdown of the market into five subordinate areas.

As noted on the exhibit, INPUT expects systems integration to experience the greatest growth rate over the next five years. This derives from the government's need for solutions, as opposed to just components. Further, the shortage of in-house technical experts, as discussed above, limits many agencies in designing their own solutions. More and more agency executives are looking to the marketplace for creativity and innovation in solving government problems.

Though programming and analysis have traditionally taken the biggest piece of professional services, INPUT now finds this changing. The growing use of software packages, as well as agency policies encouraging their use, is dampening the increase in this category. The other categories are also growing more slowly, due primarily to a folding of these activities into systems integration activities.

EXHIBIT II-2

**PROFESSIONAL SERVICES MARKET
($ Billions)**

Expenditures

AAGR   Total 6.2

Total 3.6

13%
8%
17%
11%
6%
7%

1987   1992
Fiscal Year

Facilities Management (GOCO)

Systems Integration

Software Development

Design and Consulting

Education and Training
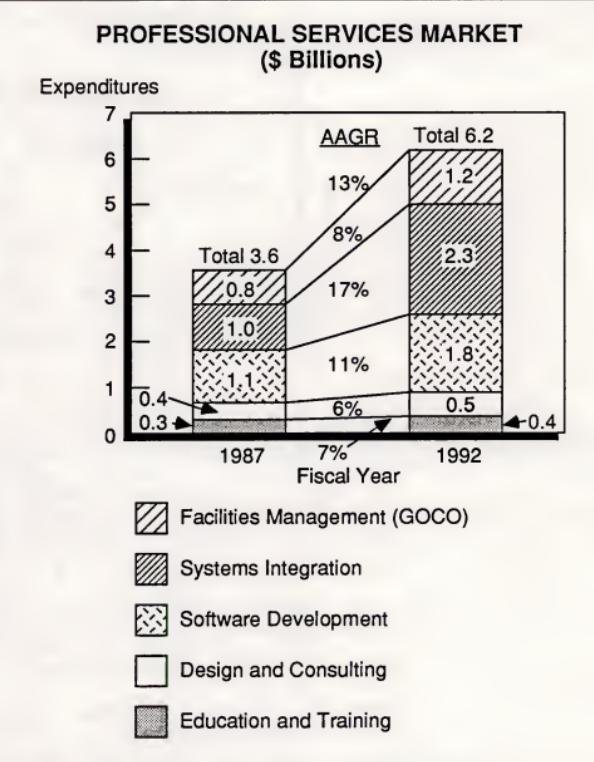
C

Application Areas

Professional services have supported and will continue to support a wide variety of application areas. While DoD and civilian agencies differ somewhat in their emphasis, the application areas of administration and data management dominate their responses, as shown in Exhibit II-3. Logistics support is also becoming more important, as agencies move to automate their supply and delivery processes.

Financial activities, along with logistics, compose the largest single set of applications. Other applications cover a range of information systems and appear unique to individual agencies. However, many agencies mention office automation, LANs, distributed processing, and centralized data base applications.

EXHIBIT II-3

KEY APPLICATION AREAS

- Administration and Logistics

- Data Management

- Financial

- MIS

- Office Automation

D

Competitive Forces

The federal professional services market continues to grow more competitive as more firms enter the market and margins grow tighter. Further, the government sets aside many professional services opportunities for small businesses or 8(a) firms. While larger companies can team on many of these opportunities, new rules on subcontracting will limit their participation.

Many companies that traditionally did not participate in this market are now beginning to play a major role. Aerospace firms, big 8 accounting firms, and even some specialized niche vendors are strengthening their Washington area offices to pursue this market.

Source evaluation and selection also complicate this marketplace. Agencies evaluate professional services proposals in a wide variety of ways, leading to some confusion on the part of the vendors. Exhibit II-4 compares vendor ranking and agency ranking of contractor selection criteria. The differences shown in this exhibit, when brought down to the specific project, may lead to unnecessary weaknesses in the proposal.

E

Agency Satisfaction

The overall level of satisfaction with contracted professional services remains fairly low. Exhibit II-5 compares agency satisfaction levels (both DoD and civilian) with vendors' perception of those satisfaction levels. The exhibit summarizes those areas with the weakest showing. For the most part, vendor responses correspond to those of their agency counterparts. The scale ranges from 1 to 5, with 5 being the highest rating.

EXHIBIT II-4

RELATIVE IMPORTANCE OF CONTRACTOR SELECTION CRITERIA

SELECTION CRITERIA	VENDOR RANKING*	AGENCY RANKING*
Proposed Technical Solution	1	1
Cost	2	4
Vendor Reputation	3	2
Project Management	4	5
Staff Experience	5	3

* Scale of 1 to 5, with 5 being highest

EXHIBIT II-5

AGENCY SATISFACTION WITH PROFESSIONAL SERVICES VENDORS

VENDOR QUALITY	RATINGS*		
	CIVIL	DoD	VENDOR
Delivery Schedule	2.8	3.3	2.9
Cost	2.9	3.8	3.2
Project Management	2.9	3.4	3.1
Development Visibility	3.1	3.6	3.1

* Scale of 1 to 5, with 5 being highest

F

Characteristics of
Successful
Contractors

As another measure of agency satisfaction, Exhibit II-6 compares the
views of agencies and vendors on the characteristics of successful con-
tractors. In this case, DoD and civil agencies differ sharply on the rank-
ings of vendor characteristics. The DoD ranks price and software devel-
opment experience as most important, while the civil agencies rank staff
experience as number one and price as number two. It is interesting to
note that vendors did rank these three characteristics as high as the agen-
cies.

EXHIBIT II-6

RANKINGS OF CHARACTERISTICS OF
SUCCESSFUL CONTRACTORS

CHARACTERISTICS	CIVIL AGENCIES	DoD AGENCIES	VENDORS
Price	2	1	1
Staff Experience	1	7	2
Software Development Experience	3	1	3
Application/Functional Experience	4	3	7

G

Recommendations

Vendors must resign themselves to the fact that, though program manag-
ers may prefer incentive contracts, most contracting officers still prefer to
do business on a fixed-price basis. Vendors must find, and put into
practice, methods of pricing and managing professional services contracts
that allow them to minimize risk. To minimize costs and remain compet-
itive, vendors should make maximum use of automated tools to in-
crease their productivity. INPUT also recommends the steps listed in
Exhibit II-7.

EXHIBIT II-7

RECOMMENDATIONS

- Vertically Penetrate Agency Customers

- Maintain Positive Reputation

- Survey Clients for Potential Problems

- Stress Standards and Interoperability

III

Market Analysis and Forecast

A

Market Forecast, 1987-1992

The federal government professional services market is expected to grow from $3.6 billion in 1987 to $6.2 billion in 1992, at an average annual growth rate (AAGR) of 13%, as illustrated in Exhibit III-1.

EXHIBIT III-1

FEDERAL GOVERNMENT PROFESSIONAL SERVICES MARKET GFY 1987-1992

| Professional Service Category | Market Size ($ Billions) | | | | | | Average Annual Growth Rate (Percent) |
| | Fiscal Year | | | | | | |
	1987	1988	1989	1990	1991	1992	
Consulting Services	0.40	0.42	0.45	0.47	0.49	0.52	6
Education and Training	0.30	0.32	0.34	0.36	0.39	0.42	7
Programming and Analysis	1.10	1.22	1.35	1.49	1.65	1.81	11
Facilities Management	0.80	0.86	0.92	0.99	1.07	1.15	8
Systems Integration	1.00	1.17	1.37	1.60	1.89	2.29	17
Total	3.60	3.99	4.43	4.91	5.49	6.19	13

Source: OMB/GSA Five-Year Plan 1988 and OMB A-11 Section 43 1B FY 1988 IT Budget Requests.

Updated 1988.

Professional services are rendered to government agencies under a variety of task names and functions. For consistency within this report and with other INPUT reports on the federal government market, professional services are defined and discussed in the following categories (also see Appendix B):

• Consulting Services

• Education and Training

• Programming and Analysis

• Facilities Management/Operations and Maintenance; for example, Government-Owned/Contractor-Operated (GOCO) projects

• Systems Integration

1. Consulting Services

Consulting services in the federal market include information systems and/or services management consulting, program assistance (technical and/or management), feasibility analysis, and cost-effective trade-off studies. Examples of government consulting services contracts are:

• Feasibility studies
• ADP requirements analyses
• System audits
• System Engineering and Technical Direction (SETD)
• System Engineering and Technical Assistance (SETA)

Consulting services are expected to increase from $400 million in 1987 to $520 million by 1992, at an AAGR of 6%. Agencies frequently need assistance in producing the technical justification for planned improvements in information technology resources because the agencies are understaffed in the technical planning and evaluation areas. Deficit reduction measures and increased use of systems integration contractors to provide design services have reduced both the level and rate of growth of consulting services.

2. Education and Training

Education and training services relate to information systems and services for the user, including CAI (computer-aided instruction), CBE (computer-based education), and vendor instruction of user personnel in operations, programming, and software maintenance. The government normally contracts for:

- Training programs
- Books and manuals
- Seminars
- Automated training systems

This submode is expected to attain an AAGR of only 7% over the 1987-1992 period, reflecting substantial budget cuts of the Gramm-Rudman-Hollings Act (GRH) in 1987-1988. Training, along with travel, are frequently the first things to be cut. The principal focus of training will be the large number of fourth-generation replacement systems for ADP architectures of the IBM 360-370 era. The dynamics of end-user computing, local-area networks, distributed processing, and new software will require retraining of more than half of the current federal government ADP work force.

3. Programming and Analysis

Programming and analysis services, also called software development, include system design, contract or custom programming, code conversion, independent verification and validation (also called IV&V), benchmarking, and software maintenance. The government usually contracts for:

- Hardware and/or software system design
- Custom software development
- Modification of off-the-shelf software products
- Software testing of custom-developed and commercial packages
- Software conversion
- Maintenance of operating and applications software
- Independent verification and validation of software packages

This service mode is expected to be the second fastest growing during this period, at an AAGR of 11%, substantially less than the 22% rate during the mid-1980s. Program rescheduling and reductions in ongoing contracts reflect agency efforts to retain in-house staffs. The shortfall in programming skills of the federal government sector will continue to be the most significant factor behind the projected growth in the out years. Government staff limits and the backlog of software maintenance tasks at most government data centers also contribute to the demand for vendor assistance in this service mode. It is not yet clear how the growing use of programmer workbench and other productivity tools will affect this market.

4. Facilities Management/Operations and Maintenance

Professional Services Facilities Management (PSFM) is also referred to as GOCO (Government-Owned/Contractor-Operated) ADP. The computing equipment is owned or leased by the government, not the PSFM

vendor; the vendor provides the staff to operate, maintain, and manage the government's facility. GOCO also includes operations and maintenance (O&M) contracts, which differ from PSFM in that they have less or no direct management/control of the facility. Both second- and third-party maintenance is included. Typical contract tasks in this submode include:

- Operation and management
- Hardware maintenance
- Software maintenance
- Site preparation and installation

This submode is not expected to grow faster than the rest of professional services because it is a mature market in the federal government. The currently projected AAGR of 8% between 1987 and 1992, reaching just over the $1 billion level in 1992, results from task reductions by agencies to save in-house staff under pressure from GRH and moves toward mission-style contracting.

Standalone maintenance contracts for both hardware and software have been included in the submode.

- Most maintenance and repair activities are funded through the operations, maintenance, and repair (OM&R) budgets of the agencies.

- OM&R budget requests are not supported by detailed documentation, as are major new and replacement ADP/telecommunication systems.

The facilities management market is treated in greater detail in a companion INPUT FISSP report, *Federal ADP Facilities Management and On-Site Operation and Maintenance Services Markets*.

5. Systems Integration

Systems integration services are associated with the design and implementation of ADP/telecommunications systems by separately contracted vendors rather than by a prime contractor as in turnkey systems products. Typical tasks that may be contracted in this submode include:

- Systems Engineering and Integration (SE&I).

- Systems Engineering and Technical Assistance (SETA).

- Systems work packages (SWP).

- Computer hardware and operating system software.

- Commercial software products and education/training services that are not contracted separately.

This service mode is the fastest growing segment of the professional services industry and is projected to become the largest share of federal expenditures by the year 1992. The OMB Circular A-11 submissions for the five-year 1987-1992 Information Technology Budget forecast indicated a probable AAGR of 17%, to reach $2.3 billion by 1992.

- For systems with life cycle costs (LCC) in excess of $20-30 million, agencies are using multiple contractors to spread the risk.

- For systems with LCCs that are less than $5-10 million, agencies are planning to use a single prime contractor or a packaged turnkey system supplier.

- Agencies are frequently undecided about the appropriate contracting route for systems between $5 and $30 million LCC.

- The forecast is based on funding needed to satisfy the system upgrade or replacement requirements for an ADP inventory that is rapidly exceeding the current six-year lifetime of third-generation systems.

This market is treated in greater detail in INPUT's FISSP report, *Federal Systems Integration Market*, revised in December 1987.

B

The Professional Services Industry

Professional services vendors have been dependent on three important factors for their growth and success:

- Agency demand for automation.

- The technical knowledge and performance levels of their personnel.

- Availability of their staffs to meet customer shortages in in-house technical expertise or manpower.

Most of the largest vendors of professional services to the government derive a significant percentage of their total professional services revenue either directly from the federal government or as subcontractors to other companies performing work under government contracts.

- This dependency upon the federal government has had a profound effect upon vendors' earnings, management, organizational structure, employees, and the commercial market.

- Government vendors of professional services tend to attract and recruit into their management ranks a high proportion of ex-government employees who understand how to navigate the complexities and deal with the competitiveness of government procurements.

Government vendors enjoy a high rate of systems enhancements, extensions, and maintenance contract awards associated with initial awards. Many of these follow-on contracts are awarded on a sole-source, noncompetitive basis due to the vendors' unique experience and knowledge of the recently completed system.

C

Vendors of Professional Services to the Government

Exhibit III-2 lists the largest professionals services vendors to the federal government. While the listed vendors do not fluctuate dramatically from year-to-year, rankings do. The continually changing demands for different services and the patterns of vendor teams for different programs make a complicated competitive structure. Very frequently, today's bidding partners are tomorrow's competitors.

EXHIBIT III-2

LARGEST FEDERAL GOVERNMENT PROFESSIONAL SERVICES VENDORS, 1987

RANK	VENDOR	USER EXPENDITURES ($ Millions)	MARKET SHARE (Percent)
1	Computer Sciences Corp.	292	8
2	UNISYS	175	5
3	General Motors/Hughes	134	4
4	International Business Machines	132	4
5	Martin Marietta	94	3
6	Honeywell	86	3
7	Boeing	68	2
8	Lockheed (LEMSCO)	55	2
9	Planning Research Corporation	54	2
10	General Motors/Electronic Data Systems	48	2

Updated 1988.

This market is dominated by systems houses and computer hardware firms. These vendors make available a broad range of skills to meet planning, development, integration, and implementation requirements.

- A sizable additional portion of hardware manufacturers' revenue is derived from the maintenance of equipment they sell to the government. Maintenance of ADPE by the original manufacturer is not included in this report except where it falls under a professional services facilities management contract.

- Systems house vendors offer services that can include the acquisition, assembly, and integration of hardware, communications, and software. These vendors do not typically manufacture hardware. Representative vendors include Computer Sciences, Electronic Data Systems, BDM International, Planning Research Corporation, and Systemhouse. This group also includes firms that have been spun off from parent organizations not in the information services industry (e.g., Boeing Computer Services, Martin Marietta, and Grumman Data Systems).

A growing force in the market is the professional services activities of tax/audit firms. Active "Big Eight" accounting firms include Arthur Andersen; Peat, Marwick Main; Price Waterhouse; Coopers and Lybrand; and Deloitte, Haskins and Sells.

"Not-for-profit" organizations, including corporations such as MITRE, Aerospace Corporation, and Sandialan (an AT&T subsidiary) and colleges and universities (e.g., Carnegie Mellon, University of California, Batelle Memorial Institute), compete with private industry for professional services work from the federal government.

Finally, some government data centers with unique skills and/or available capacity also compete with private industry for government contracts. Government agencies have the choice of whether to contract outside or to use available government centers, including capabilities in other agencies. In many cases the cost may be the same, but by staying "in-house," the agency saves the time and effort required to put a contract into place competitively.

D

Market Size by Agency

The information presented in Exhibit III-3 provides FY 87 and FY 88 budget data extracted from the Office of Management and Budget Circular A-11 agency reports. Exhibit III-3 does not cover the entire federal government, but does include those agencies surveyed by INPUT.

- Army is the largest user of consulting, education, and training. Among the civil agencies, Commerce is the largest user, followed by DoE and NASA.

EXHIBIT III-3

FEDERAL GOVERNMENT AGENCY PROFESSIONAL SERVICES BUDGETS, GFY 1987 AND 1988

PROFESSIONAL SERVICES BUDGETS ($ Millions)						
CONSULTING, EDUCATION, AND TRAINING*		PROGRAMMING AND ANALYSIS*		OPERATING AND MAINTENANCE**		
GFY 1987	GFY 1988	GFY 1987	GFY 1988	GFY 1987	GFY 1988	AGENCY
16	12	21	25	43	51	USDA
74	104	18	11	60	54	DoC
4	5	9	5	33	31	ED
49	52	259	244	188	201	DoE
50	44	164	203	24	48	GSA
23	33	160	185	174	194	HHS
<1	<1	11	17	13	13	HUD
8	15	22	22	40	42	INTERIOR
16	16	10	12	60	69	JUSTICE
3	6	9	22	26	30	DoL
42	47	247	274	356	397	NASA
7	13	50	50	47	46	DoT
32	26	37	29	102	147	TREAS
30	37	445	450	289	338	USAF
37	38	232	212	279	320	NAVY
101	111	123	220	300	350	ARMY
11	22	8	7	31	41	DLA

* Systems Integration included in both columns.
** Includes Facilities Management and Third-Party Maintenance (TPM)
Note: Rounded to the nearest million.
Source: GFY 1987 and 1988 OMB A-11 Agency Budget Requests.
Updated 1988.

- The Air Force is the largest defense agency user of programming and analysis services. Large civil users are the Department of Energy, NASA, and GSA.

- NASA is the largest single agency user of operations and maintenance services within the federal government. DoE and Health and Human Services are also large users among civil agencies, while the Army, Air Force, and Navy report substantial O&M budgets on the defense side.

According to the OMB A-11 agency budget requests, DoD continues to lead civil agencies in growth of expenditures for professional services for new information systems.

- Just as in the previous year, DoD reported a 9% growth in requests for studies that frequently are precursors to implementation of advanced technology. However, after reporting a 7% decline in such requests last year, civil agencies now expect a 43% growth for FY 88.

- Anticipated growth of systems design and engineering requests, the funding for specific implementation analyses, was stronger in DoD: 15% compared to a 28% decline for civil agencies. In the past, civil agencies not only contracted for more of these services to cover the in-house shortfall, but were also spending faster to make the advances DoD has already made. The budget cuts have caused a sudden reduction in civilian activities.

- Actual implementation expenditure growth (i.e., systems analysis and programming) remained largely flat, growing 7% in civilian agencies and 2% in DoD.

- Finally, operation and maintenance showed a dramatic increase for FY 88, with DoD increasing 39% and civilian agencies increasing 15%.

E

Federal Market Issues

The FARs (Federal Acquisition Regulations) replaced all prior procurement and acquisition regulations governmentwide in 1984.

- The FARs regulate the acquisition (purchasing procedures) of all professional services for ADP and communications that are not included under FIRMR (see below).

- The FARs apply to professional services to support:

  - Mission-Critical Computer Resources of DoD, including special-purpose and embedded computer systems or subsystems.

  - Air traffic control systems of the FAA.

- Biomedical systems of the Veterans' Administration.

- Classified systems of the intelligence community.

• Use of the FARs was expected to expedite the acquisition process. Instead, the defense and civil agency councils have introduced a number of changes that reinstituted some of the barriers of the earlier regulations and generated some new rules opposed vigorously by industry.

The Federal Information Resource Management Regulations (FIRMR) also became effective April 1, 1984, replacing the earlier FPRs (Federal Procurement Regulations), FPMRs (Federal Property Management Regulations), and DARs (Defense Acquisition Regulations) that applied to general-purpose ADP and conventional communications. Although the FAR regulates only the acquisition process, the FIRMR provides a single regulation for the acquisition, management, and use of information technology by federal agencies. Several revisions to the FIRMR were introduced in 1985 and 1986.

• The thresholds, the level above which agencies are required to request procurement authority from GSA, were experimentally raised to $10 million for several agencies.

• Services were included along with equipment and software under the regulations.

• Agencies were authorized to select a method of system acceptance for a given level of risk, other than the earlier mandated benchmark process.

GSA is currently undertaking the FIRMR Improvement Project to rewrite the FIRMR in an attempt to simplify the use of the regulations. The major objectives of the GSA effort include the following:

• Distinguish between the contracting provisions and the management/ user guides.

• Develop consistency with the Federal Acquisition Regulations (FAR).

• Restructure management and user provisions into a life-cycle format.

Revisions to Subchapter E, regarding the standard contract clauses, use of GSA schedules, and compliance with the Competition in Contracting Act will be completed first. Comments on the initial draft regulations were due in March 1988. GSA will solicit public comments in the Federal Register for the final drafts of each subchapter.

The government recently issued two new documents that will lead to increasing opportunities in the professional services market. OMB revised and reissued Circular A-120, "Guidelines for the Use of Consulting Services." The revision:

• Expands the coverage of the circular,

• Requires the designation of a senior official in each agency,

• Mandates management and reporting controls, and

• Exempts all A-76 activities.

The Circular serves to clarify the use of consultants. The Circular also excludes any activities covered by the FIRMRs. At this writing, it is not clear if, and to what extent, GSA's ongoing FIRMR rewrite activities will change the Circular's coverage. However, it is likely that some consulting will continue to be governed by the Circular instead of the FIRMRs.

On November 19, 1987, the President signed Executive Order 12615, "Performance of Commercial Activities." The press sometimes refers to this document as the "Proclamation on Privatization." The document:

• Reinforces the preference for using private firms instead of government employees for performing commercial services,

• Sets a deadline of April 29, 1988 for identifying commercial activities,

• Sets a deadline of June 30 for rescheduling all A-76 studies, and

• Lays out various other mandates to force more contracting out by agencies.

As a result of this executive order, many agencies will need to contract out more professional service activities. This might cause the growth rate to exceed the estimates contained in Exhibit III-1. However, budget reductions may offset some of these gains. In other words, professional services vendors should expect to receive a larger share of a dwindling pie.

The number of OMB Policy A-109 acquisitions continued to decline and these acquisitions were used for only the larger ($100 to $550 million) or more controversial system acquisitions. Some agencies try to avoid application of A-109 procedures completely.

• The A-109 system acquisition procedures require early participation of potential prime bidders and some of the principal first-tier subcontractors.

- The policy recommends an "up front" investment of at least 10% of program value for design and trade-off efforts.

- Non-A-109-type system acquisitions use professional services vendors in a variety of tasks that do not require prior involvement:

  - System engineering and integration.

  - Code conversion.

  - System implementation.

  - Independent verification and validation.

  - New software development.

- Agencies and vendors opposed to the application of the A-109 procedures offer several arguments:

  - They are perceived as unnecessarily delaying the implementation of the system to satisfy the frequent reviews.

  - The procedures expose the designs and rationale of the bidders to a wider audience of reviewers.

  - They allow the vendor to define the next step in the process as part of the phased deliverables.

OMB Policy A-76 recommends government reliance on the private sector for goods and services. This policy was supplemented in 1983 and 1985 to put even more emphasis on the use of the private sector.

- The policy requires conduct of a comparison of the cost of in-house staff versus contractor performance of services (including professional services) whenever an agency plans a major upgrade, replacement, or new start of ADP resources.

- To gain efficiency, the policy supports transition from the earlier "body-shop type" professional services support to "mission-type" contracting. Under the latter, the vendor determines the staffing needs and skills mix to perform the tasks.

- OMB A-76 comparisons are usually applied to facilities management and on-site operation and maintenance contracts and rarely to system design and software development projects.

- OMB asked for verification of the efficiency of using in-house ADP personnel for about 50,000 positions in the FY 1987-1988 budget reviews.

- The federal employee unions have increased their public opposition to A-76 because its application will erode their membership base.

- Periodically Congress exempts certain agencies or classes of workers from A-76 considerations.

The congressional ADPE "Buy-Not-Lease" mandate to DoD in the FY 84 budget had far-reaching implications. More than $2.1 billion of ADPE leased to the DoD was replaced in three years.

- The mandate dictated competitive acquisition of replacing systems where the purchase option would acquire obsolete equipment. Professional services vendors could be asked to bid system design and system integration opportunities.

- Competitive replacement of leased systems could offer opportunities for code conversion, new software development, and training.

- Initially the mandate was not supported by sufficient funding. Congress authorized about $150 million per year in the following fiscal year's Industrial Funds for replacement, substantially less than needed to meet the objectives.

- The moves toward use of the GSA ADP fund for economic purchase and lease-to-purchase plans by agencies and accelerated ADPE replacement funding are accomplishing the same objective.

- DoD reported that, as of the end of FY 87, it had completed the buyout of all installed systems not programmed for imminent replacement.

- The policy will remain in effect for new acquisitions, to the extent that funding is available.

Reduced emphasis on the use of small business, in particular the 8(a) program, has eroded the small-business share of government business, most notably with the drastic decline of contracting by the Departments of Education, Health and Human Services and Labor, according to the House Small-Business Committee.

- Concurrent with presidential election strategy, this committee is expected to negotiate a larger share of "Big Ticket" programs for small business firms.

- The inclusion of a firm small-business (sub)contracting plan in large ADP system bids is required by DoD, NASA, and Transportation.

- Major vendors emphasize that they are alert to beneficial and long-term relations with reliable small-business suppliers. Contract officers rate prime bidders by the duration of the subcontractor relationships.

- Those small businesses realizing the most success from the program are graduating from it, thus reducing the pool of capable companies.

IV

Federal User Requirements and Trends

A
Significant Problems/Issues

The federal government has a continuous need to steadily improve the quality and quantity of ADP services, within the confines of budget deficit reduction measures. At the same time it is overcoming the handicap of a rapidly aging ADP inventory and escalating software costs.

1. Budget and Personnel Constraints

The federal government does not currently have the in-house staff required to support the quality or quantity of ADP-supported services demanded by the Congress and by the American people. Agency respondents noted that the current federal personnel policies have kept government agencies from hiring and retaining enough qualified ADP staff. Hiring ceilings and low salaries were cited as the main reasons leading to the increased attrition rate in the government and the growing use of contractors for professional services. Furthermore, the personnel policies contain outdated standards and job descriptions, as well as impose severe administrative problems. Some resolutions to these problems are being developed. Currently, agencies are working with the Office of Personnel Management to upgrade procurement professionals and give greater support for contracting personnel. The Trail Boss Program has also been initiated; this program is expected to improve the training of contract administrators.

The Gramm-Rudman-Hollings Act imposed cuts in agency expenditures in 1986 and 1987 that resulted in limitations in the growth of the professional services market. Relief from this and other deficit control measures is expected by mid-1989.

2. ADPE Inventory Upgrade

Upgrade of the existing inventory of ADPE will initially result in reduced software maintenance costs. However, INPUT has no indication that this

upgrade will have any significant impact on overall software expenditures before the end of the 1980s.

• The impact of the ADPE purchase-versus-lease directives is not clear at this time. Because of the additional funding that would be directed toward purchase of equipment, one possibility is a slowdown in the upgrading process to new, more modern equipment and an increase in the amount of maintenance required to keep obsolete equipment (and the software designed to run on that equipment) operational until it is replaced. However, as discussed in Chapter III, other forces are expected to increase the number of opportunities.

• The GAO has estimated that 70% of life cycle software costs are related to maintenance. As more custom software is developed by or for the government, more maintenance labor will be required to keep that software functional, including interim upgrades to expand the applications of the host computers. This may lead to growth in on-site support services among professional services firms.

3. Personal Computers

The rapidly escalating rate of acquisition of personal computers by government personnel has highlighted major problems of accessibility to the government's numerous data bases.

• Acquiring significant data manually or re-encoding data from large computer printouts that should have been available electronically can require substantial effort, cause delays in data availability, or lead to inaccurate conclusions.

• Implementation of newer technology ADPE with more-efficient software imposes an additional technical problem—how to recover information from the tapes of earlier systems, especially when the file codes and procedures are inadequately documented.

• Security risks escalate with proliferation of sensitive data in PCs that are not adequately protected during absence of the user. While the impact of these risks may be uncertain at this time, it seems likely that the growth in end-user computing may dampen the growth of professional services.

4. Embedded Computers

Embedded computers are digital computers that are applied in real-time military equipment operations to solve tactical, strategic, and operational problems. An embedded computer is capable of accepting information and providing the results of these processes.

- The projected average growth through 1990 of the number of embedded computers in the DoD is 11% per year.

- The growth of embedded computers must be supported by professional services in the areas of consulting, training and education, software maintenance, and, in some cases, operations and maintenance contracts. In addition, there will be significant hardware maintenance functions.

5. Software and Related Services

There is continuing pressure on agencies to contain costs by maintaining existing software and, when that is not possible, to acquire software packages rather than create new custom software. Civil agencies have more propensity for packaged software purchases and represent better vendor targets. Commerce is the largest buyer with $24 million requested in 1988. Other large target agencies include NASA, HHS, Treasury, and Transportation.

Among defense agencies, the Air Force, Navy, and Army all have substantial systems analysis and programming budgets. However, growth in expenditures over the last three years has been slow and will remain so for the forecast period. Slow growth not withstanding, these agencies represent significant opportunities for custom software development, with over $900 million in planned spending in government fiscal year 1988 alone.

B

Civil and DoD Agency Users

The government agencies surveyed by INPUT anticipate moderate increases in use of professional services in almost all categories, as shown in Exhibit IV-1. The primary reason for the increases in the number of agencies planning to use professional services is the emphasis on new and expanded data services that exceed current staff capacity or, to a lesser extent, capabilities. Other reasons for increases are new requirements and the impact of OMB Circular A-76. The latter is having a particularly strong impact on hardware and software maintenance expenditures, especially in DoD.

Although use of consulting and education/training services will increase, there is considerable pressure to contain expenditure growth. Education/training (along with travel) may be hardest hit by this pressure. In fact, several respondents expressed a belief that the agency would conduct education/training only as required for new systems and only to the extent that the service is offered by the systems supplier. Thus, education/training would be pulled in-house and occasionally limited to on-the-job experience.

EXHIBIT IV-1

TYPE OF PROFESSIONAL SERVICES USED BY FEDERAL GOVERNMENT AGENCIES

PROFESSIONAL SERVICE CATEGORY	CIVIL AGENCIES		DoD AGENCIES	
	USE NOW	PLAN TO USE*	USE NOW	PLAN TO USE*
Consulting Services	65**	68	80	80
Education and Training	79	82	80	90
Programming and Analysis	89	89	80	80
Operations and Maintenance	86	89	80	90
Hardware Maintenance	93	96	80	90
Software Maintenance	86	89	70	100
Systems Integration	72	82	70	100

* Over Next Five Years
** As a Percent of Total Respondents in Each Category

The big winner, as reported by respondents, will be systems integration services due to the need to tie divergent systems together as a means of avoiding systems redundancy and incompatibility, as well as upgrading obsolete information systems. Initiatives that require turnkey systems will show strong growth as agencies opt for packaged systems approaches.

1. Professional Services Budget Distribution

INPUT's analysis revealed that there are significant differences in the distribution of the professional services budgets of the DoD and of the civil agencies, as shown in Exhibits IV-2 and IV-3.

EXHIBIT IV-2

**PROFESSIONAL SERVICES BUDGET DISTRIBUTION
BY SERVICE CATEGORY
CIVIL AGENCIES**

Facilities Management 21%

Programming and Analysis 31%

Consulting 11%

Education/Training 8%

Systems Integration 29%
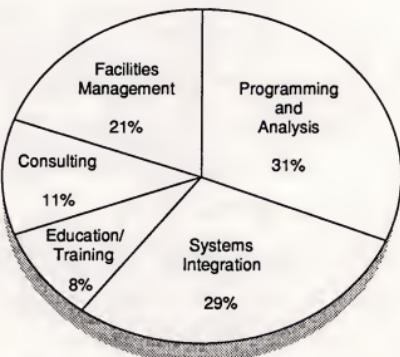
Updated 1988.

EXHIBIT IV-3

**PROFESSIONAL SERVICES BUDGET DISTRIBUTION
BY SERVICE CATEGORY
DEFENSE AGENCIES**

Facilities Management 24%

Programming and Analysis 30%

Consulting 11%

Education/Training 8%

Systems Integration 27%
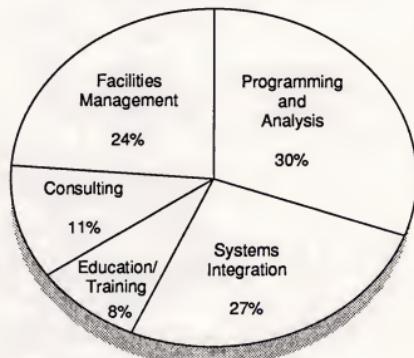
Updated 1988.

- Budget allotment distributions for consulting and education/training are similar for both types of agencies and represent approximately 20% of the professional services budgets.

- FM services in civil agencies reflect the continuing need to cover the larger staffing shortfalls in personnel. Similarly contracted programming and analysis activities represent a larger proportion of the civil agencies' professional services budgets.

- Systems integration expenditures, as a percent of this budget, are far larger in defense agencies. Their early use of "total solutions" services has continued at an accelerated pace.

2. Application Areas

The various government agencies surveyed utilize professional services contracting for many different applications. INPUT categorized the responses into several broad categories for analysis and presentation (see Exhibit IV-4a and IV-4b).

EXHIBIT IV-4a

**FEDERAL GOVERNMENT PROFESSIONAL SERVICES
APPLICATION AREAS
CIVIL AGENCIES**

- Office Automation 10%
- Administration and Logistics 25%
- Scientific 8%
- Computer Operations 14%
- MIS 15%
- Data Management 10%
- Financial 18%
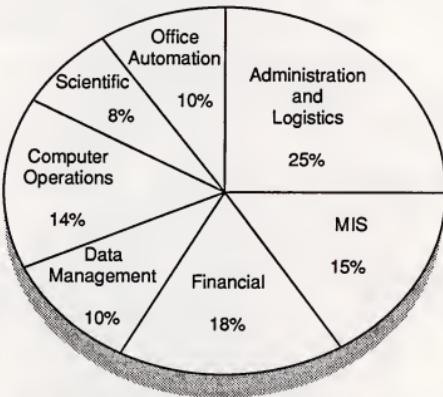
EXHIBIT IV-4b

**FEDERAL GOVERNMENT PROFESSIONAL SERVICES
APPLICATION AREAS
DoD AGENCIES**
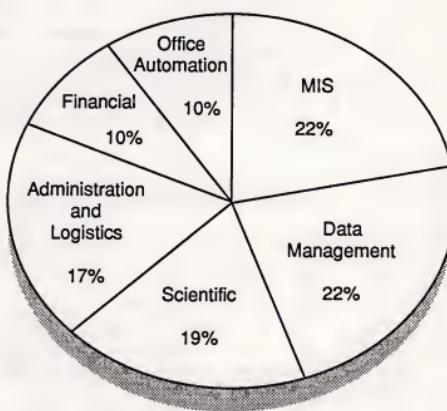
- In both DoD and civil agencies, the predominant applications for which professional services are contracted are those associated with general data processing in support of management/administrative requirements.

- Financial applications and logistics make up the largest specific applications. Other applications cover a range of information systems and appear unique to the individual needs of each agency. Mentioned systems do frequently include such tactical directions as LANs, distributed processing, and centralized data bases.

- While still a less-frequent target, office automation continues to be an application for which agencies buy professional services.

- Applications tend not to be esoteric in nature, but rather "plain vanilla" systems that serve as the backbone of each agency.

- Specific technical applications, such as those identified as scientific, make up a rather small portion of the professional services work.

Besides technical/scientific applications, the federal government agencies have many specific "mission"-oriented applications that require custom software development. Agencies are now subject to administrative

pressures to use commercial software packages when possible to support these applications.

However, due to the "specialized" nature of so many of these applications, agencies are still seeking custom software to satisfy their needs. INPUT's survey found that over half of the applications for which software is acquired by the agencies are categorized as unique to the government's operations/applications and as not having a commercial counterpart, as shown in Exhibit IV-5. Some 86% of the civil agencies and 60% of the DoD agencies have plans to continue their use of custom software over the next two to five years.

EXHIBIT IV-5

AGENCY UTILIZATION OF CUSTOM SOFTWARE

FACTOR	PERCENT OF RESPONDENTS

Custom Software Applications Unique to Government — 59 / 50

Custom Software Continued Usage — 86 / 60

Commercial/ Customized DBMS Usage — 82 / 80

0   20   40   60   80   100%

▨ Civil Agencies

▨ DoD Agencies
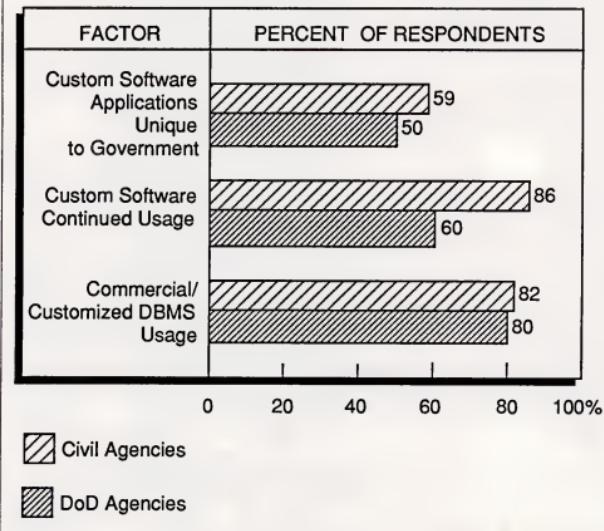
Exhibit IV-5 also indicates that a majority of the agency respondents currently use, or plan to use, a commercial or customized DBMS for a variety of applications. While this "uniqueness" continues to support custom software development, there are growing indications that, at the same time, vendors are offering more packaged features and users are devaluing this uniqueness. Both moves serve to strengthen the role of the packaged software offering.

INPUT believes that coming budget cuts, as well as a greater variety of available packages, will ultimately lead to an increase in the acquisition of packaged systems. The agency's ADP workforce will continue to require education and training as changes in end-user computing and new software systems are introduced into their computer operations. Exhibit IV-6 ranks the types of education and training requirements that would affect future spending for government services. System users and operations and applications software training were the two highest-rated factors by both groups of respondents. Similar to the applications themselves, requirements are for more, not more-advanced, topics.

EXHIBIT IV-6

EDUCATION AND TRAINING REQUIREMENTS

FACTOR	CIVIL AGENCY RANK*	DoD AGENCY RANK*
Training for System Users	1	2
Training for Operations and Applications Software	2	1
Training for Data Base Management	3	4
Training for Fourth-Generation Languages	4	5
Training for Programmers	5	3

* Rank based on frequency of mention by respondents.

Education requirements have increased over the last five years in 80% or more of the agencies (see Exhibit IV-7). Approximately 70% of the agencies foresee that their education and training requirements will increase over the next five years. However, overall requirements are declining as the current systems are put in place.

There are three main sources for funding of the agencies' education and training programs—general budget funding, user funding, and separate program/package funding. Each method of funding is utilized in different proportions by the civil and DoD agencies as shown in Exhibit IV-8. The

EXHIBIT IV-7

GROWTH OF EDUCATION AND TRAINING REQUIREMENTS

FACTOR	PERCENT OF RESPONDENTS
Educational Requirements Increased over Last Five Years	85 / 80
Educational Requirements to Increase over Next Five Years	74 / 70

0   20   40   60   80   100%

Civil Agencies

DoD Agencies
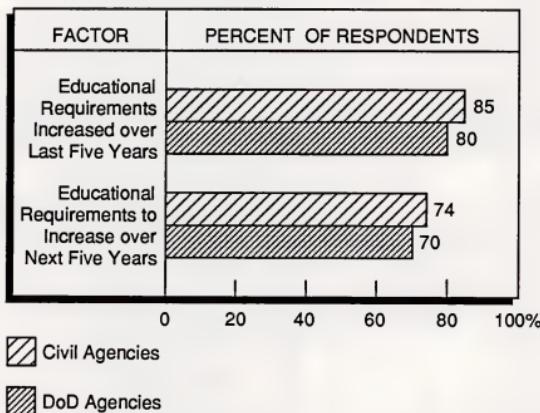
EXHIBIT IV-8

FUNDING SOURCES FOR EDUCATION AND TRAINING REQUIREMENTS

FACTOR	PERCENT OF RESPONDENTS
General Budget Funding	64 / 50
User Funding	20 / 10
Separate Program/Package Funding	16 / 40

0   20   40   60   80   100%

Civil Agencies

DoD Agencies

GFP5
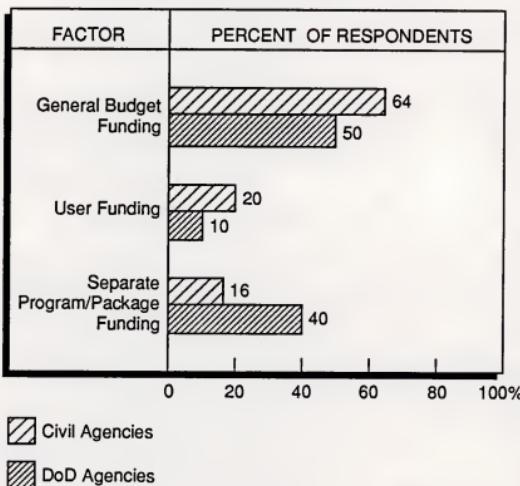
majority of funding for education and training is derived through the general budget funding.

- General budget funding suggests that many of the education/training needs are not directly associated with specific new systems but relate to training for continuing operations. Independent vendors may find significant opportunities in this arena.

- Some education/training, especially in DoD, is attached to specific program buys. While some of these buys may be for standalone training, much of it is related to new systems acquisitions. A vendor offering the new system generally offers training on the system as "customer support," a separately negotiated item, or as a subcontractor.

Professional services are being used by agencies to assist in formulating plans and moving toward standardizing computer languages. The program of standardizing languages is aimed at reduced software costs by reversing the proliferation of languages of the past two decades, and the attendant demand for a wider range of programmers.

- The transition of ADP systems to Ada, for instance, will require significant investment of resources that will be supported by professional services vendors with the capability to design, program, and maintain systems written in Ada.

- That transition, however, has been slower than expected. As depicted in Exhibit IV-9, extensive use is still made of "early generation" languages (Cobol, Fortran) by both civil and DoD agencies.

DoD agencies have taken stronger positions in both fourth-generation languages and Ada, but each is far from becoming the dominant development tool. The investment required to move to these language standards will likely occur over an extended period of time.

EXHIBIT IV-9

COMPUTER LANGUAGE USE

LANGUAGE	RESPONSES (Percent)		
	CIVIL	DEFENSE	TOTAL
Early Generation	71	50	65
4th Generation	18	30	22
Ada	11	20	13

C
Agency Perceptions
of Professional
Services

1. Advantages/Benefits of Professional Services

Civil agencies and DoD use professional services contracts primarily
because the contractors provide experience and expertise that are not
available extensively within the agency, as shown in Exhibit IV-10.

EXHIBIT IV-10

AGENCY VIEWS OF ADVANTAGES/BENEFITS
OF PROFESSIONAL SERVICES

ADVANTAGE/BENEFIT	PERCENT OF RESPONDENTS
Expertise and Staff Skills	66 / 44
Balance Staff Workload	34 / 28
Cost-Effective/Cost Savings	32 / 28
Experience	20 / 6
Staff Flexibility	15 / 17
Advance Technology	14 / 12
Staff Experience	10 / 6
Other	7 / 6

0 10 20 30 40 50 60 70

Civil Agencies

DoD Agencies
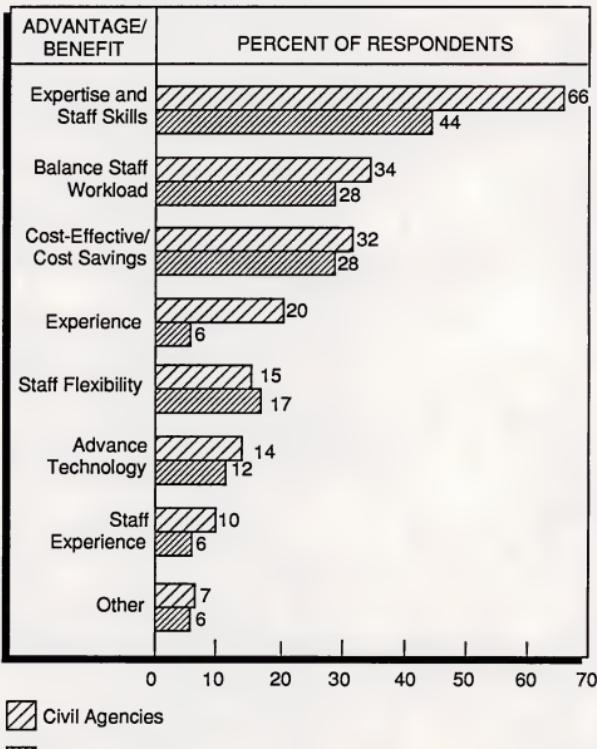
- Professional services contracts are also used because they give the agency the ability to balance workloads without increasing or decreasing government staff as requirements are added and/or removed.

- Some government respondents believe that contractor labor is less expensive than performing the same task with government employees; in addition, fixed-price contracting enables the government to put a ceiling on the overall cost. This in particular was considered an advantage by DoD respondents.

- Objectivity, which includes the ability of the contractor to take an unbiased approach to a problem without being affected by internal agency politics, is a less important benefit.

- The civil agencies consider expediency advantageous. Expediency can be measured in terms of accelerated schedules as well as in terms of fewer problems with government rules, regulations, and policies than if the work were performed in-house.

2. Disadvantages/Liabilities of Professional Services

The difficulty in managing contracts for professional services was the number-one disadvantage described by both the civil agencies and by the DoD, as shown in Exhibit IV-11. This factor was by far the major liability according to DoD respondents.

- Performance risk, or the concern on the part of government agencies that the contractor would not deliver or would deliver an unacceptable product, was considered a significant liability by civil agencies.

- The problems associated with procurement, including the long lead time required for contracting and the risk of protest by losing bidders, were considered a disadvantage by the DoD and civil agencies.

- The learning curve, or the time it takes contractors to "come up to speed" on the problem, was considered a disadvantage by 22% of the civil agencies and by 11% of the DoD respondents.

Although, as described in the previous section of this report, the agencies could not accomplish all of their assigned work without contractor support, it is considered by some to be a disadvantage to become dependent on a contractor. The consensus of those who considered this a disadvantage was that contracting for professional services weakened agency ability to do further work because the contractor ended up with most of the expertise in this area of work.

EXHIBIT IV-11

AGENCY VIEWS OF DISADVANTAGES/LIABILITIES OF PROFESSIONAL SERVICES

DISADVANTAGE/ LIABILITY	RELATIVE IMPORTANCE (Percent)

Contract Management — 27 / 33

Procurement Process — 24 / 22

Contractor Learning Curve — 22 / 11

Performance Risk — 24 / 6

Cost Growth — 11 / 11

Contractor Dependence — 10 / 11

Loss of Staff Experience — 10 / 6

0   10   20   30   40%

Civil Agencies

DoD Agencies
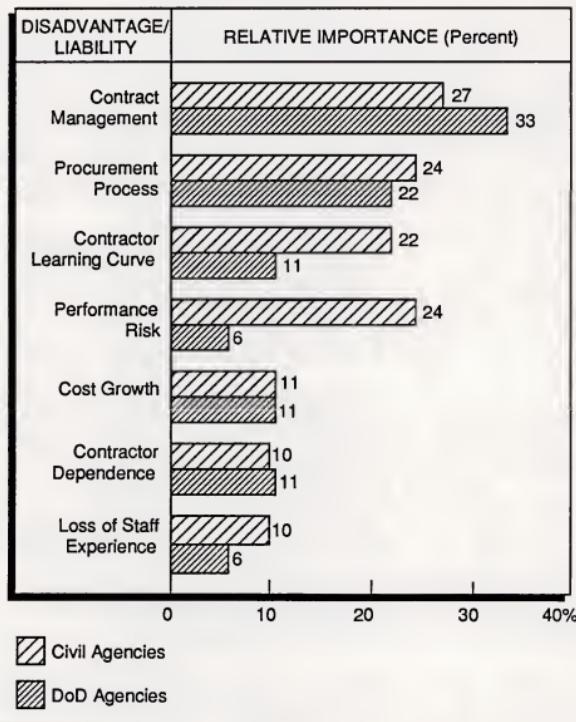
3. Agency Satisfaction Level with Professional Services

The overall level of satisfaction of agency respondents with professional services still remains quite low in both absolute terms and in comparison with previous surveys. In the earlier survey of agency respondents, the DoD agencies gave overall ratings below the 3.0 range, while the civil agencies' lowest rating was 3.1. The present survey results reflect an increased satisfaction on behalf of the DoD agencies and a reduction by the civil agencies to no higher than 2.8, as shown in Exhibit IV-12. (Vendors' ratings on these same factors are discussed in Section V.)

EXHIBIT IV-12

LEVEL OF FEDERAL AGENCY SATISFACTION WITH PROFESSIONAL SERVICES VENDORS

DISADVANTAGE/ LIABILITY	RELATIVE IMPORTANCE	VENDOR RATING
Responsiveness to Agency Needs	3.3 / 3.8	1
Quantity of Work	3.4 / 4.0	2
Quality of Work	3.4 / 3.7	3
Development Visibility	3.1 / 3.6	5
Project Management	2.9 / 3.4	5
Delivery Schedule	2.8 / 3.3	7
Cost	2.9 / 3.8	3

(scale: 1 2 3 4 5)

⧄ Civil

▨ DoD
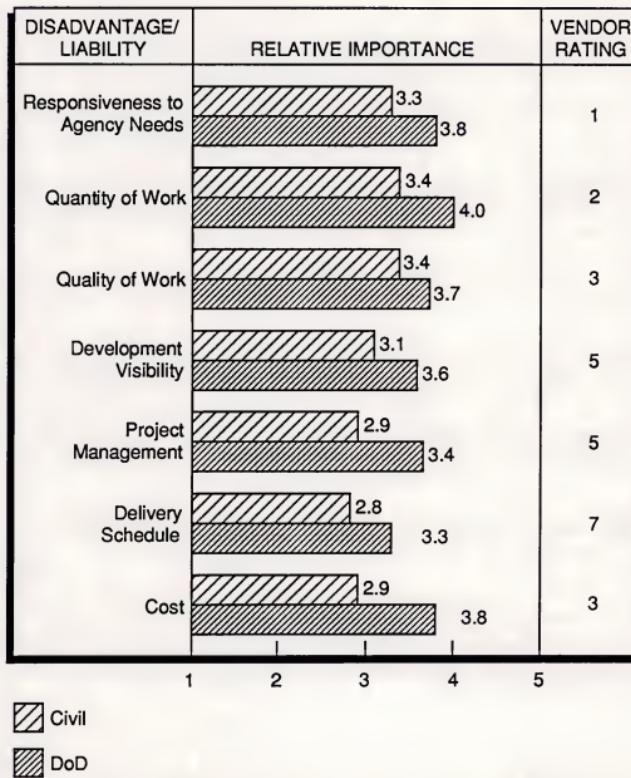
In all categories, DoD respondents were more satisfied with professional services vendors than were the civil agencies. The greatest variation is in cost, which was the characteristic ranked highest by the DoD and nearly lowest by the civil agencies.

D

Procurement
Practices

1. Characteristics of a Successful Contractor

The civil agencies and DoD totally disagree on the most important characteristic for a successful contractor, as shown in Exhibit IV-13.

EXHIBIT IV-13

RANKINGS OF CHARACTERISTICS OF SUCCESSFUL CONTRACTORS

CHARACTERISTIC	RANKING		
	CIVIL AGENCIES	DoD AGENCIES	VENDORS
Price	2	☐1	☐1
Support	4	6	○9
Staff Experience	☐1	7	2
Software Development Experience	3	☐1	3
Application/Functional Experience	4	3	7
Hardware Experience	6	5	○9
Integration Experience	6	4	4
Federal Contract Experience	8	○9	5
Agency Experience	9	7	5

Rating: 1 = Most Important (☐), 9 = Least Important (○)

The DoD ranks price and software development experience as most important, while the civil agencies rank staff experience as number one and price as number two. This discrepancy reflects the differences in emphasis that vendors must use in preparing bids.

It is interesting to note that vendors did rank these three characteristics as high as did the agencies. Unfortunately, vendors ranked much lower than did the agencies the next level of support, application and hardware experience. Price and software development experience are rated as critically important in DoD bids, as shown by their very high rating of 4.2 each in Exhibit IV-14.

EXHIBIT IV-14

AGENCY RATINGS OF THE CHARACTERISTICS OF A SUCCESSFUL PROFESSIONAL SERVICES CONTRACTOR

CHARACTERISTIC	RELATIVE IMPORTANCE

Characteristic	Civil Agencies	DoD Agencies
Price	3.9	4.2
Support	3.7	3.4
Staff Experience	4.0	3.2
Software Development Experience	3.8	4.2
Application Functional Experience	3.7	4.0
Hardware Experience	3.3	3.5
Integration Experience	3.3	3.7
Federal Contract Experience	2.9	3.0
Agencies Experience	2.7	3.2

Scale: 1 2 3 4 5

Civil Agencies
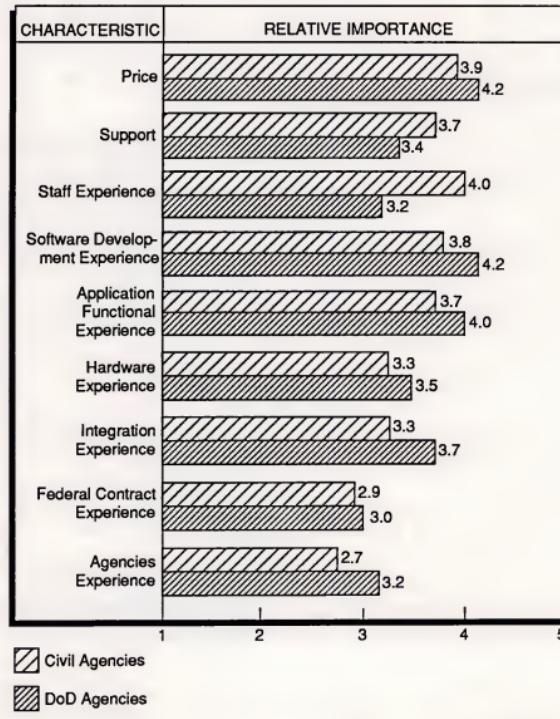
DoD Agencies

- Both the civil agencies and the DoD concur that application/functional experience is an important characteristic, whereas vendors consider it of lesser importance.

- Differences in ratings for federal contract experience and agency experience exist between the agencies and vendors. Vendors assign an important rating to both factors, while the agencies themselves give these factors the lowest ratings for importance.

2. Selection Criteria

The ranking by agencies as to which criterion is most important in the selection of a professional service vendor has changed since the previous study. As shown in Exhibit IV-15, the criterion that remains the most important is the proposed technical solution. However, vendor reputation and staff expertise have now been ranked more important than cost. Agency respondents were also mindful of the extent to which competent project management is necessary for a successful contract award.

EXHIBIT IV-15

RELATIVE RANKING OF CRITERIA USED IN SELECTING A PROFESSIONAL SERVICES VENDOR

SELECTION CRITERIA	RANKING
Proposed Technical Solution	1
Vendor Reputation	2
Staff Experience	3
Cost	4
Project Management	5

Updated 1988.

3. Preference for Type of Vendors

Both civil and DoD agencies were asked which type of vendor appears more desirable for performing their required professional services, as shown in Exhibit IV-16. Over 50% of the agencies preferred systems houses and stated that these vendors were more responsive to meeting a variety of needs and are more knowledgeable in specialized applications.

A larger share of the civil agencies (larger than the share among DoD agencies) preferred software products vendors. Civil agencies' main reason for selection of this type of organization was the software vendor's experience and suitability for certain types of professional service projects.

Presumably, agencies do not believe that all service vendors are capable in all areas. Rather, they view vendors according to the vendor's own focus and prefer to match that focus to the requirements of the project. Manufacturers come to the fore when the professional services requirements are closely tied to a hardware system, systems houses lead when a "total solution" is required, and software products vendors have the edge when the services are tied to a software package. Vendors face a "Catch-22" in that a niche is required, but the niche may preclude the vendor from other markets.

EXHIBIT IV-16

FEDERAL AGENCY VENDOR TYPE PREFERENCE FOR PROFESSIONAL SERVICES

VENDOR/ ORGANIZATION TYPE	PERCENTAGES	
	CIVIL AGENCIES	DoD AGENCIES
Mainframe Manufacture	16	15
Systems House (Non-Hardware)	55	69
Not-For-Profit	9	8
Software Products Vendors	20	8
Total	100	100

4. Contract Types

The federal agencies surveyed indicated that they have a slight preference for using a mixture of types of contracts for professional services, as shown in Exhibit IV-17. This preferred approach is a mixture of cost-plus, fixed-price and other types of contracts including incentive, fixed labor, and time-and-materials contracts. Many respondents recognize the inherent difficulties of pricing programming and analysis projects by preferring "cost plus" contracts in this area, and reserving fixed-price contracts for situations where the requirements are well defined.

EXHIBIT IV-17

FEDERAL AGENCY
CONTRACT TYPE PREFERENCE
FOR PROFESSIONAL SERVICES

CONTRACT TYPE PREFERENCE	PERCENT OF RESPON- DENTS	REASONS CITED
Cost-Plus	6	• Research Oriented/ Developmental Services
Cost-Plus Incentive Fee	30	• Nonspecific Requirements • Innovative/Creativity • More Valuable to Agency
Fixed-Price	30	• Requirements Well Defined • Reduce Government Liabilities • Government Retains Control
Mixed/Other	34	• Depends on Type of Service • Time and Materials Gives Flexibility

Agency respondents were also queried on whether they utilize Multiple-Award Basic Ordering Agreements to acquire professional services. Some agency officials currently have limited experience with the BOAs, but see usage increasing as a means of reducing procurement lead time. Sixty-four percent of all the respondents noted an increase government-wide, while another 14% felt the increase in BOAs was limited to GSA only. Usage is expected to decline at the Departments of Treasury and Education.

E

Projected Trends
in the Use of
Professional Services

1. Increases/Decreases in Contracting

INPUT's survey revealed that in all but one of the professional services categories a majority of both the civil and DoD respondents expect no change in the amount of services they plan to use in the next five years, as shown in Exhibit IV-18. In addition, a small percentage of respondents expect decreases in the use of professional services.

A similar percentage of civil and DoD respondents anticipated an increase in the use of professional services. The estimated increase in the amount of professional services was higher in the DoD that in the civil agencies. Except for consulting and education/training, the average expected change across the responding agencies is a healthy 17%.

2. Transition/Conversion to In-House Support

When a professional services contract is completed, the government is faced with a choice—should the continued support be transferred in-house, or should that continued support be obtained from a vendor? As presented in Exhibit IV-19, the civil agencies prefer to convert the program to contractors for continued support services. Half of the DoD agencies surveyed have no clear policy and make a decision based on the circumstances of the specific project.

As a follow-up to this question, the government agencies surveyed by INPUT were asked to reveal any plans to either convert professional services contracts to in-house or to convert in-house support functions to outside contractor support. Exhibit IV-20 shows that while there are many more plans to convert in-house support to outside contractor support than vice versa, there is a growing body with plans to move services and support from contractors to in-house. With the current shortfall of staff and funds, it may be that these plans more accurately reflect contract prioritizations; that is, only priority projects will be contracted and other projects will be scheduled as time and money permit.

EXHIBIT IV-18

AGENCY-PROJECTED CHANGES IN PROFESSIONAL SERVICES CONTRACTING OVER THE NEXT FIVE YEARS

PROFESSIONAL SERVICE CATEGORY	CIVIL AGENCY SUMMARY			
	(PERCENT OF RESPONDENTS)			AVERAGE CHANGE (PERCENT)
	EXPECTED INCREASE	EXPECTED DECREASE	NO CHANGE	
Consulting Services	28	7	65	+10
Education and Training	31	7	62	+8
Programming and Analysis	45	4	51	+16
Facilities Management/ Operations and Maintenance	31	7	62	+18
Hardware Maintenance	35	10	55	+12
Software Maintenance	35	10	55	+15
Systems Integration	51	10	43	+20
DoD AGENCY SUMMARY				
Consulting Services	20	10	70	+17
Education and Training	40	10	50	+20
Programming and Analysis	50	10	40	+22
Facilities Management/ Operations and Maintenance	30	10	60	+17
Hardware Maintenance	30	10	60	+18
Software Maintenance	50	10	40	+18
Systems Integration	40	10	50	+17

EXHIBIT IV-19

AGENCY PREFERENCE FOR SOURCE OF CONTINUED SUPPORT SERVICES

PREFERENCE FOR CONTINUED SUPPORT OF PROFESSIONAL SERVICES CONTRACT	PERCENTAGES	
	CIVIL AGENCIES	DoD AGENCIES
Bring Program In-House	31	20
Leave Program Out-of-House	41	30
No Preference	28	50
Total	100	100

EXHIBIT IV-20

AGENCY PLANS FOR CONVERSION OF CURRENT PROFESSIONAL SERVICES AND SUPPORT

PLANNED CONVERSION	PERCENTAGES	
	CIVIL AGENCIES	DoD AGENCIES
From Contractor to In-House Staff	24	30
From In-House Staff to Contractor	51	60
No Conversion Plans	25	10
Total	100	100

3. Reasons for Transition/Conversion

In the few occasions reported, the reasons the government agencies plan to convert professional services contracts to in-house support are to reduce costs and to minimize reliance on contractors. The DoD was more concerned about cost reduction, and the civil agencies, except for NASA and Energy, were more concerned about minimizing their dependence on contractors. The application areas are primarily those of a general business type. In NASA and Energy, facilities and ADP operation are readily contracted out, to relieve the scientific and technical in-house staffs.

The reasons the government agencies plan to convert in-house functions to outside contractor support are:

• Take advantage of expertise not available within the government.

• Balance workloads and supplement in-house staffs.

• Reduce costs.

• Expediency.

• Satisfy the requirements of government policy, in particular OMB Circular A-76.

Almost all types of applications are planned for conversion to outside contractor support. The majority of the candidate applications are administrative in nature. Those to be converted to satisfy the requirements of OMB Circular A-76 are primarily in the areas of applications software maintenance and operations and maintenance of hardware.

4. Factors Affecting Future Use of Professional Services

From the perspective of the government respondents, the nontechnical factors that are expected to affect the future use of professional services by the federal government are the same for both defense and civil agencies, as shown in Exhibit IV-21. However, the degree of impact differs.

Funding issues head the list of concerns for both civil and DoD, but nearly twice as many civil respondents mentioned this factor. Until the next presidential election, funds for defense initiatives should not be an overwhelming problem. This is quite apparent in DoD responses to changes in the administration, budget, or national policy.

EXHIBIT IV-21

AGENCY VIEWS OF FACTORS IMPACTING
FUTURE USE OF PROFESSIONAL SERVICES

FACTOR	PERCENT OF RESPONDENTS

Budget Process Restrictions — Civil Agencies: 52, DoD Agencies: 28

Staffing Restrictions — Civil Agencies: 21, DoD Agencies: 11

Directives and OMB Policies — Civil Agencies: 17, DoD Agencies: 11

Administration Changes — DoD Agencies: 11

Federal Budget Policy — Civil Agencies: 14, DoD Agencies: 22

National Policy Changes — Civil Agencies: 21, DoD Agencies: 16

Scale: 0 10 20 30 40 50 60 70

Civil Agencies

DoD Agencies

Directives and OMB policy factors are ever present, with marginally larger civil respondents perceiving a significant impact. Agency respondents cited that the OMB Circulars, especially OMB A-120, which contains guidelines for use of consulting services, have made it more difficult to contract for professional services. Some respondents commented that they are hopeful that the proposed revisions to the FIRMR will clarify the definition of ADP support services and provide some assistance to contracting officials.

GSA policies are also mentioned as being in a state of change. Many respondents were of the opinion that the General Services Administration is attempting to make it easier for agencies to buy services. Also, the Trail Boss Program would enhance the need for professional services to help justify resources and to support the concurrent process.

Federal personnel policies are also driving an increase in the use of professional services firms. Practically all agency executives that INPUT interviewed cited difficulty in hiring staff with strong technical credentials. In the Washington area, at least, good candidates can frequently obtain higher salaries and better benefits in the private sector than in the government. Many government employees with fewer than fifteen years of service are leaving government. Thus, agency executives, usually with more than twenty years of service themselves and looking toward retirement, must contract out most of their technical support activities.

Another critical need exists in the area of contract administration. Historically, Contracting Officers' Technical Representatives (COTRs) have often been inadequately trained for their jobs. This led to insecurity, manifesting itself in two unfortunate ways:

• Some COTRs accept virtually everything the vendor tells them, leading to poor government oversight of the project, and

• Some COTRs accept virtually nothing the vendor tells them, finding security in "doing everything by the book." This often leads to delays and inadequate attention to the government's real problems.

GSA's training initiatives for the "Trail Boss" program represents a major step toward improving contract administration. Through Trail Boss, agency executives will learn, among other things, the proper techniques in dealing with contractors. This knowledge may then trickle down to the staff dealing directly with contractors on a day-to-day basis. The good COTR is fair, flexible, but sometimes firm. As agencies increase their dependence on professional services firms, better contract administration will likely result.

Agency representatives were also asked to identify technical factors that would alter their agency's professional services plans. More than 25 factors were identified, and the five that were named most frequently are listed in Exhibit IV-22.

EXHIBIT IV-22

TECHNOLOGICAL FACTORS AFFECTING FUTURE GOVERNMENT SPENDING FOR PROFESSIONAL SERVICES

FACTOR	CIVIL AGENCIES RANK*	DoD AGENCIES RANK*
Evolution in Use of Personal Computer	1	1
Advances in Software Development and Maintenance	2	4
Improvements in End-User Capabilities	3	5
Changes in Microcomputer Architecture	4	2
Proliferation of LANs	5	3

* Rank based on frequency of mention by respondents.

- The technological factors reported to have the greatest impact was the evolution in the use of personal computers.

- From there, DoD continued its technically oriented concerns, citing both changes in micro architecture and LANs. Civil agency respondents, on the other hand, concentrated on the operational questions of software development, maintenance, and improving end-user capabilities.

5. Future Suggestions for Improvements to Vendor Services

Agency respondents were queried on their suggestions for how vendors might make their professional services more valuable to the federal government over the next five years. As should be expected, the replies varied due to the different types and levels of experiences the respondents have encountered with vendors.

EXHIBIT IV-23

CIVIL AGENCIES' SUGGESTIONS FOR IMPROVEMENTS TO VENDOR SERVICES

SUGGESTIONS	RANK*
Increase Cooperation and Responsiveness to Agency Needs	1
Increase Experience of Staff	2
Increase Adherence to Agency Pricing Policy	3
Increase Management Skills	4
Increase Availability of Off-The-Shelf Software	5

* Rank based on frequency of mention by respondents.

In descending order of frequency of mention, Exhibit IV-23 lists the principal suggestions made by the civil agencies. Improvements in responsiveness to agency needs and increased levels of staff experience were cited most frequently. The DoD agencies, however, offered more technically oriented suggestions. These agencies cited a need for more integrated services to be provided and for vendors to have a greater awareness of standards, as shown in Exhibit IV-24.

Interviews with agency representatives also solicited responses to the question of how effectively vendors completed teaming arrangements. Respondents were in agreement that vendors were already doing a "pretty good job," but some improvements could be made. Current shortcomings were in the area of acquiring specialization, project management, and staff expertise. Also noted was a significant level of problems between team members and a lack of communication with the government in the formulation of teams in response to government needs. In some cases, agency executives find themselves in the position of arbitrating disputes among team members.

EXHIBIT IV-24

DEFENSE AGENCIES' SUGGESTIONS FOR IMPROVEMENTS TO VENDOR SERVICES

SUGGESTIONS	RANK*
Increase Availability of Integrated Services	1
Increase Awareness of DoD Standards	2
Increase Use of Fourth-Generation Tools for Development	3
Increase Work Force's Knowledge and Ability	4
Increase Awareness of Agency Requirements	5

*Rank based on frequency of mention by respondents.

V

Professional Services Competition Trends

A

Professional Services Respondent Characteristics

Exhibit V-1 displays a profile of the vendors from three perspectives—total corporate revenue, professional services revenue, and percentage of professional services revenue from the federal government. The vendor respondents represent many of the largest professional services suppliers to the industry as a whole and to the federal government sector.

The vendors surveyed generally sold each of the categories of professional services, as shown in Exhibit V-2. Revenue distribution parallels the industry with program analysis, systems integration, and consulting as the primary revenue sources.

Vendors plan to provide additional professional services in the future in response to demands from government clients. A primary reason for this increased demand is the Reagan Administration's emphasis on OMB A-76 policy. In addition, some of the government clients prefer a single contractor to be responsible for all aspects of developed systems. Chapter III contains additional information on the new Executive Order on Privatization.

As depicted in Exhibit V-3, vendors have acquired professional service contracts for support functions (that were previously performed in-house) more frequently than they have lost them. The percent of contracts gained from in-house staff remains roughly the same as in the previous study, but the share of vendors experiencing a loss of contracts has declined. This situation seems to reflect the agencies' continuing shortage of in-house staff available to perform support services.

As shown in Exhibit V-4, the experience of the vendors surveyed is that most frequently the follow-on support for professional services contracts with the government for design, programming, and analysis is provided out-of-house by the original vendor. In-house follow-on has decreased rapidly, while third-party follow-on has kept pace at approximately the same amount as previously reported.

EXHIBIT V-1

REVENUE CHARACTERISTICS OF RESPONDENT PROFESSIONAL SERVICES VENDORS

CORPORATE REVENUE ($ MILLIONS)	PERCENT
Less than $500 Million	38
$500 Million-$1 Billion	24
Over $1 Billion	38
PROFESSIONAL SERVICES REVENUE ($ MILLIONS)	PERCENT
0 to 100	8
100 to 250	25
250 to 500	42
Over $500	25
GOVERNMENT PERCENT OF PROFESSIONAL SERVICES REVENUE	PERCENT OF VENDORS
Less than 20%	8
20% to 80%	24
80% to 100%	68

Updated 1988.

EXHIBIT V-2

TYPE OF PROFESSIONAL SERVICES PROVIDED BY RESPONDENTS

| CATEGORY | PROPORTION OF RESPONDENTS | | AVERAGE PORTION OF RESPONDENT REVENUES |
	CURRENTLY PROVIDING (Percent)	PLAN TO PROVIDE (Percent)	
Consulting Services	85	85	30
Education and Training	77	85	5
Programming and Analysis	92	100	27
Facilities Management/ Operations and Maintenance	54	77	20
Hardware Maintenance	23	31	5
Software Maintenance	70	77	8
Systems Integration	77	85	34

Updated 1988.

EXHIBIT V-3

RESULTS OF PROFESSIONAL SERVICES COMPETITION FROM IN-HOUSE GOVERNMENT STAFF

Vendors Losing Contracts to In-House Staff — 38

Vendors Gaining Contracts from In-House Staff — 69

0   20   40   60   80   100%

Proportion of Respondents

Note: Total exceeds 100% because the results are not mutually exclusive.

Updated 1988.
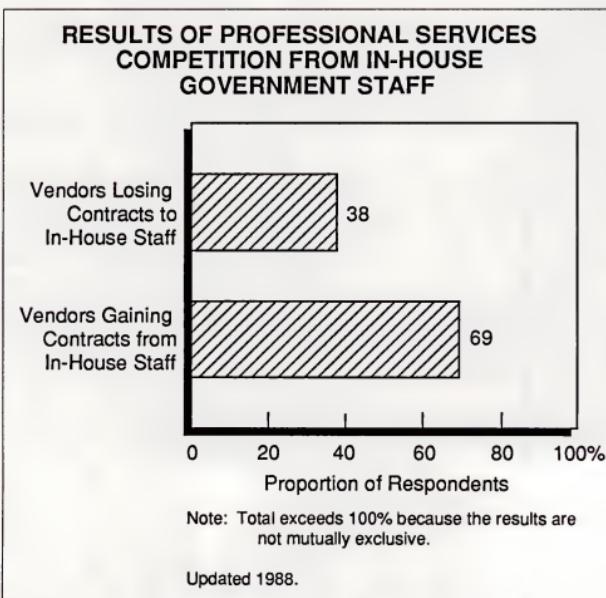
EXHIBIT V-4

SOURCE OF FOLLOW-ON SUPPORT FOR PROFESSIONAL SERVICES CONTRACT

SOURCE OF FOLLOW-ON SUPPORT FOR COMPLETED PROFESSIONAL SERVICES CONTRACT	PROPORTION OF RESPONDENTS (Percent)
In-House by Government	8
Out-of-House by Previous Vendor	77
Out-of-House by Another Vendor	15
Total	100

Updated 1988.

- The type of work moved in-house to government staffs typically varies from hardware and software maintenance to consulting, analysis, and operations and maintenance. Applications ranged from administrative and financial systems to avionics systems and shipboard computing systems.

- The primary reason given for moving the work in-house is to involve government personnel in the work and to eliminate reliance of the government on vendor personnel support of agency work. A secondary reason is to reduce the costs by minimizing the amount of effort assigned to maintain software systems. Infrequently, it is part of an OBM A-76 cost comparison.

- The majority of the follow-on professional services support provided by vendors is for operations and maintenance but there are several instances of consulting, software development, and software maintenance. Applications include administrative and financial systems; data bases; shipboard weapons systems; and environmental, health, and energy systems.

- Most often the government utilized contractors for follow-on support because either the agency does not have sufficient staff and/or the expertise to perform the tasks or an OMB A-76 cost comparison indicates that contracting is more cost-effective.

B
Vendors' Perception of Government

1. Advantages/Benefits of Contracting

Vendors surveyed by INPUT have typically had wide-ranging opinions on the advantages and benefits to the federal government of using professional service contracts. These were similar to those expressed by the government agencies, as shown in Exhibit V-5.

- The ability to obtain expertise not available within the government agency was seen as a primary benefit to the government of contracting for professional services. Vendors believe that specialized skills are more easily obtained by contracting and that contractors can change the skill mix readily when the government's requirements change.

- Reduced cost to achieve results was also seen as an important advantage in contracting for professional services. Vendors believe that the competitive environment allows the government to contract for professional services in a very cost-effective manner.

- The ability to balance workloads and augment in-house government staffs during peak workload times was considered an advantage because the government can start or stop work without any dislocation of in-house personnel, and there is an added cost benefit because reduction-in-force (RIF) costs are avoided.

EXHIBIT V-5

VENDOR VIEWS OF ADVANTAGES/BENEFITS OF PROFESSIONAL SERVICES

ADVANTAGE/ BENEFIT	PERCENT OF RESPONDENTS
Cost-Effective	52
Expertise and Special Skills	44
Balanced Workload	32
Experience	20
Staff Experience	20
Problem Focus	16
Work Quality	16
Other Benefits	16

(scale: 0 10 20 30 40 50 60)
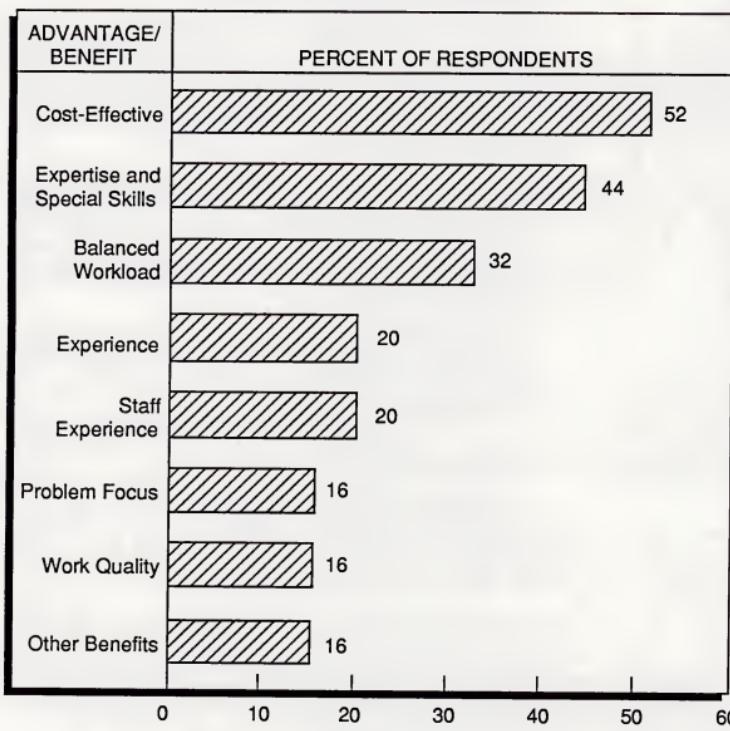
- Expedience, or a means of getting work done faster without the inherent administrative problems of shifting personnel to perform the work in-house, was considered another significant advantage. Several vendors believe that there is less hassle and fewer problems associated with ADP if the work is performed by a professional services contractor.

- Some vendors believe that contractor employees are more motivated to perform than government employees.

2. Disadvantages/Liabilities of Contracting

The vendor views of the disadvantages and liabilities of contracting for professional services shown in Exhibit V-6 are again similar to those of the government agencies surveyed, as shown in Exhibit IV-11.

EXHIBIT V-6

VENDOR VIEWS OF DISADVANTAGES/LIABILITIES OF PROFESSIONAL SERVICES

DISADVANTAGES/ LIABILITIES	PERCENT OF RESPONDENTS
Procurement Problems	36
Dependence on Contractor	24
Contract Controllability	16
Contractor Learning Curve	16
Performance Risk	12
Cost Control	12

0   10   20   30   40%
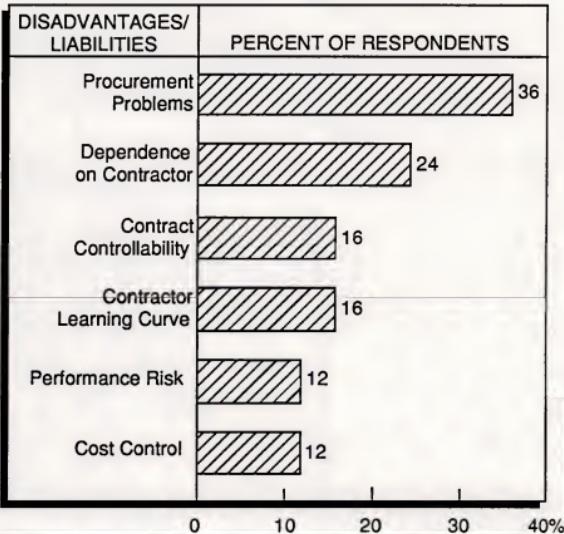
- The major disadvantage identified by the vendors was that associated with the actual procurement process. Vendors consider the government procurement process long and inflexible. They believe the government has a problem in evaluating quality versus price, and there is always the threat of a protest if the lowest-priced bidder does not win.

- Dependence on the contractor was considered another major liability. If contracting does not allow the government in-house staff to build its skills, then when the contractor leaves the expertise leaves, and when contracts are recompeted, some loss in continuity can occur if the incumbent is replaced.

• Performance risk is another liability because the lack of control by government agencies over contractor personnel is a potential problem area.

• Contract management is also considered a significant disadvantage. Some vendors stated that dealing with the complexities and legal obligations of a contract can pose problems.

3. Differences between Commercial and Federal Government Markets

The industry respondents were asked to identify what they perceive to be the differences between the commercial markets and the federal market for professional services. These stated differences are presented in Exhibit V-7.

EXHIBIT IV-7

GOVERNMENT VERSUS COMMERCIAL MARKET DIFFERENCES

MARKET DIFFERENCES		
FEDERAL MARKET	COMMERCIAL MARKET	RANK*
Greater Price Sensitivity	Less Price Sensitivity	1
Complex Acquisition Process	Simpler Purchasing Procedures	2
Wider Range of Evaluation Criteria	Narrower Basis for Award	3
Lengthy Phased Development Cycle	Shorter-Term Evolution	4
Subject to Greater Legal and Economic Constraints	Less Rigid Legal and Economic Constraints	5

*Rank based on frequency of mention by respondents.

Updated 1988.

- Based on frequency of mention, the greater price sensitivity for acquiring services in the federal government was the most highly rated difference. The second-most-noted difference was the complexity of the acquisition process in the federal government, compared to the purchasing procedures followed in the commercial market.

- Surprisingly, pressure on profits was not included in the survey results. Unlike commodity vendors (hardware and packaged software vendors, telecommunications service providers), professional services firms are selling the time of expert people. The competitive environment makes it difficult to pay proper salaries in some contracts and then provide the appropriate multiplier. A recent report cited a government contract in which "engineers" were receiving $7.29/hour in wages and benefits. At that level, the government runs the risk of obtaining little or no usable support from the contractor.

- Another pressure on profits comes from cash flow, a particularly difficult problem in professional services contracts. Under DCAA rules, a government contractor may not bill out the interest expense associated with performing a contract. However, in many contracts, agencies withhold 10% to 20% of the incurred expenses until contract completion. If a contract runs more than a year and represents more than $100,000 in billings, cash flow problems can arise. This may discourage some small vendors from bidding on otherwise excellent government opportunities.

4. Vendor Perceptions of Agency Opportunities

Professional service vendors differ as to which agencies provide the most attractive opportunities. Some vendors have narrowed their federal government marketing to only the DoD agencies or selected civil agencies, while other vendors serve both.

Exhibit V-8 shows that 69% of the vendors conduct business with both the DoD and civil agencies. This group will increase over the next few years as more DoD vendors seek to expand their business base to civil. Frequent department targets include Treasury, NASA, Health and Human Services, Energy, and Transportation.

Over 20% of the respondents serve only the defense agencies for professional services. The smallest share of the vendors has chosen to concentrate their professional service business within the civil agencies.

EXHIBIT V-8

VENDOR PERCEPTION OF AGENCY OPPORTUNITIES FOR PROFESSIONAL SERVICES

AGENCY OPPORTUNITIES	PERCENTAGE
DoD Agencies and Civil Agencies	69
DoD Agencies Only	23
Civil Agencies Only	8

Updated 1988.

5. Satisfaction Level

Vendors were asked their opinion of the level of satisfaction of government agencies with the past performance of professional services contractors. The results are presented in Exhibit V-9. The agency responses are shown in the earlier Exhibit IV-12.

Vendors believe the federal government is reasonably satisfied with their responsiveness to agency needs and quantity and quality of work. However, the satisfaction levels given by the vendors themselves are not very high. In terms of several characteristics, notably cost and delivery schedule, vendors consider the government satisfaction level relatively low indeed.

This represents a fundamental problem for professional services vendors. Unless they can improve the perceived satisfaction levels to higher levels, the potential growth in the market may not be realized. Many of the vendor surveys offered the comment that there needs to be an increased emphasis on holding down costs and having a timely delivery of the products and services.

6. Suggested Improvements to Products and Services

The industry respondents were asked what they believe vendors need to do over the next five years to make their products and services more valuable to the federal government. The replies varied due to the different types and levels of experience the vendors have encountered with the federal agencies.

EXHIBIT V-9

VENDOR-PERCEIVED LEVEL OF GOVERNMENT AGENCY SATISFACTION WITH PROFESSIONAL SERVICES CONTRACTORS

FACTOR	SATISFACTION LEVEL
Responsiveness to Agency Needs	3.6
Quantity of Work	3.5
Quality of Work	3.2
Cost	3.2
Project Management	3.1
Development Visibility	3.1
Delivery Schedule	2.9

0   1   2   3   4   5
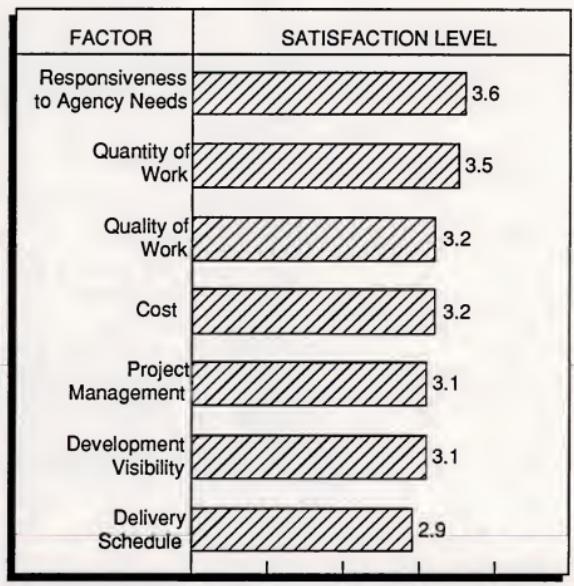
In descending order of frequency of mention, Exhibit V-10 lists the principal suggestions made by the respondents.

Improving the flexibility with which vendors incorporate requirement changes was cited most frequently as a means of making vendor services more valuable to agencies. The vendors also noted the development of better lines of communication and increasing the quality and reliability of products as suggested areas of improvement. Many of the suggestions made by the vendors were similar to those made by the civil and DoD agencies. To the extent that these steps aid the vendors' ability to be responsive to agency needs, vendors should adopt them.

EXHIBIT V-10

SUGGESTED IMPROVEMENTS TO PRODUCTS AND SERVICES

SUGGESTION	RANK*
Improve Ability to Incorporate Requirement Changes	1
Develop Better Lines of Communication	2
Increase Quality and Reliability of Products	3
Improve Management and Reporting Capabilities	4
Improve Familiarity with Industry Standards and Technology	5
Improve Productivity	6

*Rank based on frequency of mention by respondents.

Updated 1988.

C

Vendor View of Contracting

1. Available Contracting Vehicles

Vendors provide professional services to the government under a variety of contract types.

- Cost-plus contracts provide for vendor costs to be paid and a fee added that is either negotiated (cost-plus-fixed-fee) or based upon the performance of the contractor in satisfying the contract requirements (cost-plus-award-fee). Cost-plus contracts regulate the margin of profit allowed, but clearly place the risk with the government.

- Fixed-price contracts commit vendors to perform and complete a contract at a predetermined price ceiling. To a significant extent, the profitability associated with a fixed-price contract is dependent upon the vendor's ability to accurately appraise, in advance, the cost of providing services. Managing fixed-price contracts successfully requires an extremely well written and detailed statement of work and project scope. The risk of completion is placed on the vendor.

- Level of effort (LOE) or time and materials (T&M) contracts provide for an hourly billing rate for the various labor categories to be applied to a contract plus the reimbursement by the government for travel, supplies, equipment, and other materials required to satisfy the terms of the contract. In many competitive situations, vendors are required to combine their contracts with a "not-to-exceed" clause that essentially imposes cost ceilings on the contract.

2. Preferred Contract Types

As shown in Exhibit V-11, vendors now have a preference for fixed-price contracts.

EXHIBIT V-11

VENDOR PREFERENCE FOR CONTRACT TYPE FOR PROFESSIONAL SERVICES

PREFERRED CONTRACT TYPE	PERCENTAGES	
	VENDORS	AGENCIES
Cost Plus/Cost Plus Incentive Fee	23	36
Fixed Price	47	30
Mix	23	24
Other	7	10

Rating: [ ] = Most Preferred.

Updated 1988.

Adhering to fixed-price contracts has several implications for vendors. Respondents noted that they can expect to decrease profit margins and therefore will need to more accurately assess their costs of doing business and trim operations where possible. Furthermore, vendors were of the opinion that DoD was attempting to limit the profits made by contractors.

A number of vendors classify LOE and T&M contracts as fixed-price since each hourly billing rate is fixed for the duration of the contract. As noted earlier, however, the federal government's general preference for "overall lowest cost," or price, has led to a number of vendors offering bids with unpaid overtime or minimum wages for some technical levels.

The vendors were also evenly split in their preference for cost-plus and a "mix" of contracts. Vendors will continue to prefer a mixture of types of contracts in order to minimize their financial risk. This particularly applies to programming and analysis contracts where the financial risks are substantial.

Industry respondents are also exploring opportunities to provide professional services to federal agencies under Multiple Award Schedule Basic Ordering Agreements. Forty-three percent of the respondents surveyed currently provide services under BOAs. Contracts mentioned include FEDSIM, GSA, Energy, and DoD.

3. Characteristics of a Successful Contractor

As shown in Exhibit V-12, the vendors ranked price, staff experience, and software development as the three most important characteristics, as did the agencies, but not in the same order of importance as shown earlier in Exhibit IV-13.

EXHIBIT V-12

VENDOR PERCEPTION OF THE RELATIVE IMPORTANCE OF VENDOR CHARACTERISTICS TO FEDERAL AGENCIES

FACTOR	LEVEL OF IMPORTANCE
Price	4.5
Staff Experience	3.9
Software Development Experience	3.7
Integration Experience	3.7
Federal Contract Experience	3.6
Agency Experience	3.6
Application Functional Experience	3.4
Hardware Experience	3.0
Support	3.0

1   2   3   4   5
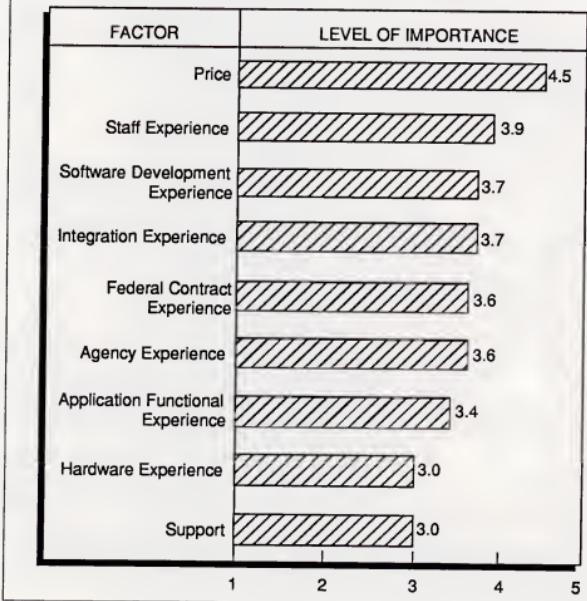
Support and hardware experience were rated as the least important of all characteristics by the vendors. As previously noted, these characteristics were reported by government respondents as important to winning a bid. This incongruence needs to be addressed.

One reason for the divergence of opinion is that the agency respondents are looking at the situation after the bid has been awarded, whereas contractor respondents were primarily oriented toward getting the business rather than operating the contract. However, vendors should emphasize their support capabilities and preference in their bids. Unfortunately, it is INPUT's experience that most professional service vendors cannot provide evidence of customer satisfaction since they do not carry out systematic surveys in this area. ·

4. Perception of Most Attractive Product or Service

Vendors were asked which of their company's professional services or product capabilities they think agencies find most attractive. The responses ranged form the specific categories of professional services under study in this survey and extended to other products or services related to the vendors' areas of expertise.

EXHIBIT V-13

VENDOR RANKING OF PRODUCTS AND SERVICES GOVERNMENT AGENCIES FIND MOST ATTRACTIVE

PRODUCT/SERVICES	RANK*
Programming and Analysis	1
Systems Integration	2
Consulting	3
Project Management	4
Financial Systems	5
Support	6

* Rank based on frequency of mention by respondents.

As shown in Exhibit V-13, the most frequently cited professional service was programming and analysis. The next most attractive service was systems integration. The top six products/services also included consult-

ing, project management, and support. These types of services tend to support higher salary levels, and greater credit is given to the technical credentials of the proposed staffs.

5. Selection Criteria

Vendors need to better understand and respond to the criteria utilized by the government in selecting a winning vendor for professional services. As shown in Exhibit V-14, vendor respondents considered the proposed technical solution the number-one selection criterion.

EXHIBIT V-14

VENDOR PERCEPTION OF THE RELATIVE IMPORTANCE OF CONTRACTOR SELECTION CRITERIA TO FEDERAL AGENCIES

SELECTION CRITERIA	VENDOR RANKING	AGENCY RANKING
Proposed Technical Solution	1	1
Cost	2	4
Vendor Reputation	3	2
Project Management	4	5
Staff Experience	5	3

Updated 1988.

As noted earlier in Exhibit IV-15, the most recent survey of agencies does not concur with the vendor perceptions, except for the proposed technical solution. Many vendors have noted, however, that the technical solution is usually the entrance ticket to a price, not cost, "shoot-out," where either the preferred or lowest-priced vendor wins.

D

Trends, 1988-1992

1. Increases/Decreases in Professional Services

A majority of the vendors surveyed foresee an increase in the amount of professional services work with the government over the next two to five years, as shown in Exhibit V-15. The largest increases anticipated are in systems integration, consulting services, and facilities management.

EXHIBIT V-15

VENDOR-EXPECTED CHANGE IN
CONTRACTING FOR PROFESSIONAL SERVICES

PROFESSIONAL SERVICE CATEGORY	PERCENT OF RESPONDENTS			AVERAGE CHANGE* (Percent)
	EXPECTED INCREASE	EXPECTED DECREASE	NO CHANGE	
Consulting Services	46	8	46	30
Education and Training	31	—	69	7
Programming and Analysis	38	8	54	30
Facilities Management/ Operations and Maintenance	39	—	61	25
Hardware Maintenance	—	—	100	—
Software Maintenance	24	—	76	15
Systems Integration	69	8	23	40

* Change over the Next Five Years, GFY 1988-1992.

Updated 1988.

The majority of the vendors surveyed view the government's increased use of packaged software as not hindering the professional services market. The respondents were of the opinion that there will still be ample opportunities for modification, installation, training, and integration of software by professional service vendors. Furthermore, vendors commented that the federal agencies do not have the necessary in-house expertise to perform many of the software-related services.

The industry respondents were also asked their opinion on whether the government would increase its procurement of System Engineering/Technical Assistance (SETA) and Systems Engineering and Integration (SE&I) services. Eighty-four percent of the respondents feel that the government will increase its contracting for SETA and SE&I due to the lack of federal personnel to accomplish these tasks. Vendors noted that some of the SETA awards may become part of other larger contracts at agencies.

2. Factors Affecting Government Spending

Vendors surveyed by INPUT suggested numerous factors that could increase or decrease federal government spending on professional services in the next two to five years. INPUT grouped these factors into the five categories presented in Exhibit V-16

EXHIBIT V-16

RANKING OF FACTORS AFFECTING FUTURE GOVERNMENT SPENDING FOR PROFESSIONAL SERVICES

FACTOR	RANK*
Budget Changes (Authorization, Appropriation, Apportionment)	1
Government Personnel Availability	2
Legislative Policy Changes	3
Regulatory Policy Changes	4
Political Oversight	5

*Rank based on frequency of mention by respondents.
Updated 1988.

- The factor that had the most consensus among vendors was the impact of budget changes. The most frequently mentioned factor was the emphasis on budget cuts and changes in authorization and appropriations.

- The availability of government personnel was also considered an important factor. Included in this factor is not only the shortage resulting from congressionally imposed limits on agency staffing but also the lack of sufficient numbers of specialists and managers in newer ADP technology within the government.

- Legislative and regulatory policy changes, in particular OMB A-76 and OMB A-130, were considered to be important influences.

- Some of the vendors noted political oversight as a factor. In particular, this uncertainty of congressional pressures was fueled by the recent intervention of Congressional Committees into major agency ADP and telecommunications acquisitions.

3. Industry Factors Affecting Vendor Revenue

The factors that vendors believe will have an impact on their professional services revenue are numerous and varied. INPUT listed the responses, in order of frequency mentioned, in Exhibit V-17.

EXHIBIT V-17

RANKING OF INDUSTRY FACTORS AFFECTING REVENUE IN THE FEDERAL MARKET

FACTOR CATEGORY	RANK*
Increased Competition Due to CICA	1
Consolidation of Contracts	2
Merger and Acquisition of Firms	3
Industry Standardization Efforts	4
Education and Training of Government Staff	5
Less "Customization"	6
Increased Role of RBOCs	7

*Rank based on frequency of mention by respondents.
Updated 1988.

- The Competition In Contracting Act (CICA) is designed to bring fair and open competition to the contract award process. Opening the market to an increasing number of vendors is believed by the respondents to be a major force shaping their future revenues. Several vendors noted that some new entrants appear to be "niche" players.

- Respondents also viewed the federal agencies' trend to consolidate contracts as possibly eliminating some of their prospects for future opportunities and recompetes for professional services programs.

- Another major influence arises from the continuing mergers and acquisitions throughout the industry. The expansion of resources within the larger restructured firm allows for reorganizing into a stronger competitor.

- The other factors cited by the respondents in Exhibit V-17 are important considerations for vendors to keep in mind as they evaluate their own future investment of resources.

4. Technology Trends

At the present time, 67% of the vendors included in INPUT's survey are qualified in Ada, as shown in Exhibit V-18. These same vendors did not report having a great deal of contract work that required the use of this Ada expertise. Another 19% reported that they are planning to become qualified in Ada when it is required in order to acquire contracts for professional services work.

Industry representatives were also asked to identify those technological factors that would alter the federal government's spending for professional services. The factors named most frequently are listed in Exhibit V-19.

- The increase in optical disk storage system capabilities was most frequently cited by the vendors as having a strong impact on future professional service acquisitions. Agencies are already seeking to procure these optical disk storage systems as they attempt to upgrade their major information systems.

- Artificial intelligence is gaining in usage in tactical situations, automated planning, and support applications throughout DoD. Large-scale information processing is the principle area of applications for AI as it is developing in the civilian agencies.

- Standards are being established through a consensus of federal regulatory and standards organizations, industry organizations such as ANSI and IEEE, and the vendor community. Progress toward development of OSI standards is being realized through the recent cooperation of U.S.

EXHIBIT V-18

CURRENT AND PLANNED VENDOR QUALIFICATION IN ADA

STATUS	PERCENT OF RESPONDENTS
Vendors Currently Qualified in Ada	67
Vendors Planning to Become Qualified	19
Vendors with No Current Plans for Ada	14
Total	100

EXHIBIT V-19

VENDOR RANKING OF TECHNOLOGICAL FACTORS AFFECTING FUTURE GOVERNMENT SPENDING FOR PROFESSIONAL SERVICES

FACTOR	RANK*
Increase in Optical Disk Storage Capabilities	1
Developments in Artificial Intelligence	2
Standardization Efforts	3
Developments in Interface Capabilities	4
Increase in Use of Supercomputers	5
Telecommunications Developments	6
Increased Use of Fiber Optics	7

*Rank based on frequency of mention by respondents.

Updated 1988.

industry and governmental efforts. OMB is considering mandating the use of OSI-compatible systems throughout the federal government. The issuance of a governmentwide policy for OSI would help to aggregate the market and establish consistency with commercial product development.

E

Recommendations

Vendors must resign themselves to the fact that, while program managers may prefer incentive contracts, most contracting officers still prefer to do business on a fixed-price basis. Vendors must find, and put into practice, methods of pricing and managing professional services contracts that allow them to minimize the risk of performance on a fixed-price basis, or they will not be able to compete successfully in the government marketplace. To minimize costs and remain competitive, vendors must make maximum use of automated tools to increase their productivity.

Vendors should vertically penetrate potential agency customers to better understand the agency mission and functions and to solve the agency problems, not modify the problem to meet an available solution. Much can be accomplished by stressing the benefits to the customer, rather than the benefits of the service.

Vendors should be aware that, especially in the civil agencies, their reputation is an important factor in whether they can win work with an agency. The government is a "small community," and a questionable reputation in one agency can impede getting work in another. Overcoming a "poor" reference can take a long time. It is extremely important that vendors regularly and systematically survey their agency customers to determine problems, satisfaction levels, trends, and opportunities. This should not be done through the field staff but by a central organization. In at least part of the survey, an independent third party should be employed to prevent biases and provide objective standards.

Vendors can make more effective use of their marketing budget if they emphasize their marketing in areas that are politically popular. In election years, Congress reacts to programs that gain or hold votes. In presidential election years, budgets are more likely to emphasize domestic issues and spending programs than technology or defense. Further, any service that stresses standards or interoperability will likely fare well.

The surveys of government agencies revealed projected increases in the amount of future contracting for operations and maintenance. In addition, similar increases are projected for software maintenance. This type of work requires specialized expertise that not all vendors possess; however, vendors that do should ensure that they take advantage of this potential growth area. These areas may not always be as attractive as developing state-of-the-art systems but they are less risky and often financially more rewarding.

Opportunities for involvement with the increasing number of government supercomputer installations will require new programming and engineering skills that closely match the proposed areas of application. Vendors interested in this submarket need careful research of the target to assure prospects

VI

Professional Services Opportunities

A
Present and Future Programs

Funding for professional services is provided in several budget categories of federal government agencies.

- Both support and direct investigation may be funded by research and development (R&D) elements.

  - Direct investigation may be identified in the R&D program descriptions.

  - Support services may be included in a general support budget element.

- Professional services acquired through procurement funding may be separately identified or included in an overall information system acquisition.

- Professional services oriented toward operation and maintenance or facility management will not be specifically identified within O&M or administrative budget elements of the agencies.

Most medium and smaller professional services projects and tasks, valued at less than $2 million, are rarely identified in agency budget documents, unless specifically related to an information technology R&D project.

New professional services opportunities that are larger than $1-2 million are listed in at least one of the following federal government documents.

- OMB/GSA Five-Year Plan, which is developed from agency budget requests submitted in compliance with OMB Circular A-11.

- Agency long-range information resource plans developed in response to reporting requirements of the Paperwork Reduction Act of 1980.

- Agency annual operating budget requests submitted to both congressional oversight and appropriations committees based on the OMB A-11 information.

- OMB Circular A-76 agency support services review schedules for conduct of cost comparisons on a site-by-site, year-by-year basis.

- Commerce Business Daily for specific professional service opportunities, for qualification as a bidder, and to obtain a copy of the RFP or RFQ.

- Five-Year Defense Plan, which is not publicly available and the supporting documentation of the separate military departments and agencies. Segments usually available include:

  - R-I: RDT&E Budget Request.

  - P-I: Procurement Budget Request.

  - Classified program documentation available to qualified DoD contractors.

This report includes service modes that are, or will be, separate reports in the FISSP. The details of these markets will be provided in the following reports; only the year-to-year market potential is included in this report.

- *Federal Government Systems Integration Market, 1987-1992* includes systems engineering and integration, code conversion, independent verification, and validation opportunities within custom systems design and implementation projects.

- *Federal Government Facilities Management Market, 1987-1992* includes the PSFM (professional services facilities management or government-owned, contractor-operated) and federal O&M (operations and maintenance) markets.

The programs identified in this report are typical of this market, but the list is not all-inclusive.

- Professional services is the largest market segment of the federal government and is expected to remain so during this decade.

- Most professional services contracts are multiyear documents, employing options or contract modifications to remain in force for a given vendor.

- With only a few exceptions, most services contracts are limited to three to five years in duration and require that the services be recompeted publicly.

- Contracts for professional services range in value from less than $10,000 to more than $700 million. The majority of contracts fall in the less than $2 million category.

The list of opportunities becomes smaller after FY 88 because new programs have not yet been identified or initially approved by the responsible agency. Subsequent issues of this report and the INPUT Procurement Analysis Reports will include additional programs and detailed program information for FY 1988 to FY 1992.

All funding proposals are based on cost data of the year submitted, with inflation factors dictated by the Administration as part of its policy, and are subject to revision, reduction, or spread to future years in response to congressional direction. Some additional reductions will be likely in FY 1988 and beyond due to the deficit reduction constraints of the Gramm-Rudman-Hollings Act.

B

Professional Services
Opportunities by
Agency

Agency/Program	PAR Reference	RFP Schedule	FY88-FY92 Funding ($M)
Army			
Army/Army Research Institute/ Comprehensive Army Research Institute Systems	V-2-23	Unknown	—
Army/Corps Theater ADP Service Center (CTASC)	V-2-30	Unknown	124.6
Army/Information Systems Engineering Command (ISEC)/Army Corporate Data Base Project (ACDBP)	V-2-31	3QFY88	53.5
Air Force			
USAF/Astronautics Laboratory/Data Services Contract for AFAL	V-1-22	1QFY91	12.6
USAF/Space Command/System Engineering Support for NORAD Computer System	V-1-30	FY91	9.8
USAF/ESD/WWMCCS Information System (WIS)	V-1-32	—	17.6

Agency/Program	PAR Reference	RFP Schedule	FY88-FY92 Funding ($M)
Air Force Logistics Command (AFLC)/ Technical Integration	V-1-95	Bids Due 5/16/88	—
Air Force/Human Resources Laboratory (AFHRL)/Integrated Maintenance Information System Program (IMIS)	V-1-110	5/88	—
Navy			
Navy/Commander Naval Sea Systems Command/Navy CAD/CAM	V-3-14	5/22/87 (RFI) RFP Unknown	—
Navy/Pacific Missile Test Center (PMTC)/ DPSCWEST Computer Center Facilities Contract	V-3-56	FY91	24.6
Navy/Naval Air Development Center/ Facilities Management of the Central Computer Center	V-3-72	3/89	15.0
Marine Corps			
USMC/MAGTF (Marine Air Grand Task Force) Lift Model II–Software Design and Development	V-3A-8	—	4.6
Agriculture			
Department of Agriculture/Farmers Home Administration (FmHA)/Automated Administrative Management System (AAMS)	VI-5-24	—	5.6
DOC			
Department of Commerce/International Trade Administration/Export Control Automated Support Systems (ECASS)	VI-6-25	8/88	0.25
Education			
Dept. of Education/Office of Postsecondary Education/Campus-Based Processing (CBP)	VII-13-7	2QFY89	7.0

Agency/Program	PAR Reference	RFP Schedule	FY88-FY92 Funding ($M)
Energy			
Dept. of Energy/Savannah River Plant/ Management and Operation of the Savannah River Plant	VI-7-84	Bids Due 5/20/88	$6,000.0
EPA			
Environmental Protection Agency/ Facility Management of the National Computing Center	VIII-17-7	10/90	—
FEMA			
Federal Emergency Management Agency/ Integrated Management and Economic Analysis System (IMEASY)	VIII-18-8	FY90	1.25
GSA			
General Services Administration/Public Building Service/PBS Task Order Support	VIII-14-11	3QF91	—
General Services Administration/Office of Software Development and Information Technology	VIII-14-15	—	—
General Services Administration/Information Resources Management Services/Facilities Management for the General Supply Fund System; Regional Offices Systems	VIII-14-18	2QFY89	—
HHS			
Dept. of Health and Human Services/Health Resources and Services Administration/ADP Support Services	VII-8-32	5/88	13.2
Dept. of Health and Human Services/Health Care Financing Administration (HCFA)/Project to Redesign Information Systems Management	VII-8-34	3QFY88	43.6
HUD			
Dept. of Housing and Urban Development/ Computerized Homes Underwriting Management System (CHUMS)	VII-9B-1	9/88	47.9

Agency/Program	PAR Reference	RFP Schedule	FY88-FY92 Funding ($M)
Interior			
Dept. of the Interior/U.S. Fish and Wildlife Service/Service Support for the Western Energy and Land Use Term	VII-9-10	2/89	—
Dept. of the Interior/Bureau of Land Management/ Automated Land and Mineral Record System (ALMRS)	VII-9-11	5/88	89.4
Dept. of the Interior/Office of Surface Mining Reclamation and Enforcement/Coal Data Management Information System (CDMIS)	VII-9-12	—	25.8
Dept. of the Interior/Office of Surface Mining Reclamation and Enforcement/Applicant Violator System	VII-9-13	—	25.2
Dept. of the Interior/U.S. Geological Survey/ EROS (Earth Resources Observation System) Data Center	VII-9-17	4QFY90	40.0
Dept. of the Interior/Bureau of Indian Affairs/ Geographic Information System	VII-9-18	Unknown	3.5
Justice			
Dept. of Justice/Civil Division/Automated Litigation Support (ALS) Recompetition	VII-10-21	1QFY89	85.5
Dept. of Justice/Tax Division/Litigation Support	VII-10-18	—	10.7
Dept. of Justice/Land and Natural Resources Division/Automated Litigation Support (LSUP)	VII-10-20	2QFY90	9.4
DOL			
Dept. of Labor/Employment Standards Administration/Black Lung Automated Support System Facilities Management	VII-9A-3	9/88	56.9
NASA			
NASA Ames Research Center/Master Programming Contract, Recompetition	VIII-15-8	Award Pending	—

Agency/Program	PAR Reference	RFP Schedule	FY88-FY92 Funding ($M)
NASA Ames Research Center/Operations Central Computer Facility	VIII-15-12	Award Pending	5.0
NASA Goddard Space Flight Center/Customer Data and Operations System (CDOS)	VIII-15-62	5/88	—
DOT			
Dept. of Transportation/Research and Special Programs Administration/ADP Support Services Contract	VII-11-30	1/92	127.6
Treasury			
Dept. of Treasury/U.S. Customs Service (USCS)/ Treasury Enforcement Communications System (TECS II)	VII-12-56	4QFY89	78.5

Appendix: Professional Services Interview Profiles

A
Agencies

The interviews were conducted by telephone for 90% of the respondents, the remaining 10% were on-site contacts.

The following distribution of respondents were contacted within the DoD and the civil agencies:

	Policy	Buyers	Users	Total
Civil	14	10	11	35
DoD	7	2	4	13
Total	21	12	15	48

B
List of Agencies Interviewed

• Department of Agriculture.
  - Economic Management Service.
  - ASCS.
  - Soil Conservation Service.

• Department of Commerce.
  - International Trade Administration.
  - Office of Information Policy and Planning.
  - Office of Procurement Management.
  - Patent and Trademark Office.

• Department of Defense.
  - Air Force
    · Office of the Secretary.
    · Military Airlift Command.
    · Communications Group.
    · Logistics Command.

- Army.
  · DARCOM.
  · Civil Personnel Center.
- Navy
  · Office of NALTOACS Program.
  · Navy Medical Command.
  · Space Command.
- Defense Logistics Agency.
- Office of Secretary of Defense

- Department of Education.
  - Office of Information Resources Management.

- Department of Energy.
  - Information Systems Division.
  - Office of ADP Services.

- Department of Health and Human Services
  - Office of the Secretary.
  - Social Security Administration.
  - Public Health Service.

- Department of Housing and Urban Development.
  - Computer Services Group.
  - Office of Acquisition Management.

- Department of Interior.
  - Office of Information Resource Management.
  - Office of Management Analysis

- Executive Office of the President.

- Department of Justice.
  - Drug Enforcement Agency.
  - Federal Bureau of Investigation.

- Department of Labor.
  - Office of Information Resources Management.

- Department of Transportation
  - Office of Information Systems and Telecommunications Policy.
  - Federal Aviation Administration.

- Treasury Department.
  - Secret Service.
  - Office of Information Resources Management.
  - Internal Revenue Service.
  - Bureau of Public Debt.

- Environmental Protection Agency.
  - Office of Information Management.

- General Services Administration.
  - Office of Information Resources Management.
  - Office of Software Development and Office Technology (2).
  - FEDSIM.

- National Aeronautics and Space Administration.
  - NASA Headquarters—Office of ADP Management.
  - Langley Research Center (2).

- Securities and Exchange Commission.

- Veterans Administration.

C

Professional Services Vendors

For the updated study, INPUT contacted a representative sample of vendors who provide professional services to the federal government. Job classifications among individual vendor respondents included marketing as well as administrative executives. All contacts with vendor personnel were made by telephone.

B

Appendix: Definitions

The definitions in this appendix include hardware, software, services, and telecommunications categories to accommodate the range of information systems and services programs described in this report.

Alternate service mode terminology employed by the federal government in its procurement process is defined along with INPUT's regular terms of reference, as shown in Exhibit B-1.

The federal government's unique non-technical terminology that is associated with applications, documentation, budgets, authorization, and the procurement/acquisition process is included in Appendix C, Glossary.

EXHIBIT B-1

FEDERAL INFORMATION SYSTEMS AND SERVICES PROGRAM
SYSTEMS AND SERVICES

```
                Telecom                              Hardware
                Services                             (Systems)

      Switched          Dedicated          Mainframe          Micro-
      Networks          Networks                              Computer

 Common              Local Area                              Personal
 Carrier             Networks        Minicomputer            Computer

 Value-Added         Remote          Large                   Workstation
 Networks            Networks        Computer

                                     Super                   Word
                                     Computer                Processor

                                     Systems
                                     Software

                     Mass                                    Front/
                     Storage                                 Back-End
                                                             Processors

                                     Peripherals

          OCR                                               Printer

                           Tape
          Keyboard         Drive                            Plotter

                           Disk                             Large Screen
          Modem            Drive                            Display
```

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EXHIBIT B-1 (Cont.)

FEDERAL INFORMATION SYSTEMS AND SERVICES PROGRAM
SYSTEMS AND SERVICES
(Cont.)

```
          Integrated                              Professional
           Systems                                  Services

  Professional   Turnkey    Systems      Contract      Systems        Facilities
   Services      Systems    Hardware     Services    Integration     Management

    Systems                 Systems      Software    Integration &    Facilities
   Engineering              Software    Development   Engineering      Control

    Systems               Application   Consulting   Application    Operations &
   Integration             Software                   Software      Maintenance

    Software      Training   Installation  Systems   Education &    Programming
   Development                            Design       Training      & Analysis

   Installation   Maintenance           Education &                 Repair &
                                          Training                  Replacement

    Training                            Documenta-
                                           tion

   Maintenance
```

EXHIBIT -1 (Cont.)

FEDERAL INFORMATION SYSTEMS AND SERVICES PROGRAM
SYSTEMS AND SERVICES
(Cont.)
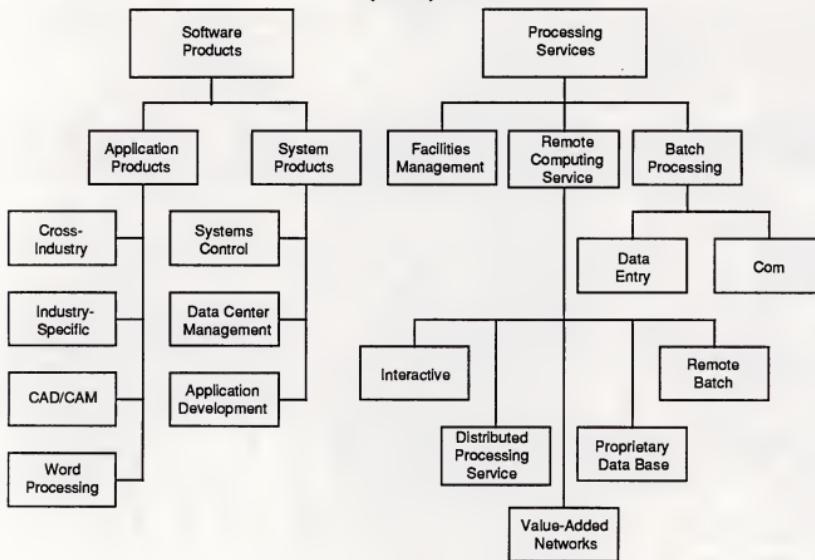
A

Service Modes

1. Processing Services

Processing services include remote computing services, batch services, and processing facilities management.

Remote Computing Services (RCS) - Provision of data processing to a user by means of terminals at the user's site(s). Terminals are connected by a data communications network to the vendor's central computer. The most frequent contract vehicle for RCS in the federal government is GSA's Teleprocessing Services Program (TSP). RCS includes the following submodes.

- *Interactive (timesharing)* - Characterized by the interaction of the user with the system, primarily for problem-solving timesharing but also for data entry and transaction processing; the user is on-line to the program/files.

- *Remote Batch* - Where the user hands over control of a job to the vendor's computer which schedules job execution according to priorities and resource requirements.

- *Proprietary Data Base* - Characterized by the retrieval and processing of information from a vendor-maintained data base. The data base may be owned by the vendor or by a third party or be licensed by a federal agency.

- *Value-Added Network Services* - Special purpose and/or high-quality network specifically designed to carry digital information, with features not usually provided by the voice-grade, switched public network.

- *Distributed Processing Services* - Alternately called "Distributed Data Processing" (DDP) that can provide:

  - Access through the network to the RCS vendor's larger computers.

  - Local management and storage of a data base subset that will service local terminal users via the connection of a data base processor to the network.

  - Availability of significant software that may be "down loaded" as part of the service.

Batch Processing - These include data processing performed at vendors' sites for user programs and/or data that are physically transported (as opposed to transported electronically by telecommunications media) to

and/or from those sites. Data entry and data output services, such as keypunching and computer output microfilm processing, are also included. Batch services include expenditures by users who take their data to a vendor site that has a terminal connected to a remote computer for the actual processing.

Processing Facilities Management (PFM) - Also referred to as "Resource Management," "Systems Management," or "COCO" (Contractor-Owned, Contractor-Operated). The management of all or part of a user's data processing functions under a long-term contract of not less than one year. This would include remote computing and batch services. To qualify as PFM, the contractor must directly plan, control, operate, and own or lease the facility provided to the user, either on-site, through communications lines, or in a mixed mode.

2. Professional Services

Professional services provide labor-intensive consulting, design, education and training, programming and analysis, management, and systems integrations as defined within these general categories.

- *Contract Services* - Provision of professional and technical services of various skill levels to accomplish specific tasks not specifically or necessarily associated with a delivered product, other than paper or ADP media records. Contracts generally require vendor management of staff and/or resources.

- *Consulting* - Information systems and/or services management consulting, program assistance (technical and/or management), feasibility analyses, and cost-effectiveness trade-off studies.

- *Education and Training* - Products and/or services related to information systems and services for the user, including computer-aided instruction (CAI), computer-based education (CBE), and vendor instruction of user personnel in management operations, programming, and maintenance of systems.

- *Systems Design* - Preparation of systems/sub-systems architecture, specifications, and performance criteria from functional information processing statements or performance of an operations requirements study. May include ADP, telecommunications, site layout, training, and maintenance facilities.

- *Software Development* - Also known as programming and analysis services, this includes applications and systems software design, contract or custom programming, code conversion, independent verification and validation (IV&V), and benchmarking. These services may also include follow-on software development and maintenance.

- *Documentation Services* - Vendor preparation, modification, or replacement of system operating manuals, software coding records, training manuals, software library records, and equipment modification records.

Professional Services Facilities Management (PSFM) - Also referred to as GOCO (Government-Owned, Contractor-Operated) services. The computing equipment is owned or leased by the client (government), not by the vendor. The vendor provides the staff to operate, maintain, repair, schedule, and manage the client's facility over a term of three to five years. Submodes include:

- *Facilities Control* - Vendor management, including scheduling of resources and personnel, to meet specified operations objectives or produce specified information products, with no direct client supervision.

- *Operation and Maintenance (O&M)* - Vendor operation and maintenance of government-owned ADP/telecommunications equipment in a government-owned/leased facility (on-site) without vendor management of the facility.

- *Programming and Analysis (Support)* - Vendor-furnished professional and technical staff support, which may be provided on or off the client's site, to analyze information processing requirements, plan resource applications, and/or develop/modify/maintain custom software, over a period of time not less than one year. Contracts tend to be task-oriented to control the work flow.

- *Hardware and/or Software Maintenance* - Vendor-furnished services provided after installation and acceptance by the government, where the vendor may not be the original supplier (third-party maintenance or TPM) and may use either on-site or on-call personnel to perform services.

- *Repair and Replacement* - Vendor-furnished services and acquires information system components to repair or replace worn or defective equipment and to add equipment needed to meet new or unusual requirements.

Systems Integration - Services associated with design and integration, software development, and installation and government acceptance of ADP/telecommunications systems. Services may also include related engineering activities such as Systems Engineering and Integration (SE&I) or Systems Engineering and Technical Assistance (SETA).

- *Engineering and Integration* - Vendor-furnished technical services provided separately from acquisition of hardware and software to expand the initial design into specifications, interface descriptions, installation, and operating instructions of the complete system.

- *Applications Software* - Custom software development to satisfy non-commercially available information processing requirements of an integrated system.

- *Education and Training* - Vendor development of training aids, manuals, and curricula for indoctrinating client management, operation and maintenance, and information product user personnel on the newly integrated information system.

3. Turnkey Systems

Turnkey systems, also known as integrated systems, include systems and applications software packaged with hardware as a single entity. Most CAD/CAM systems and many small business systems are integrated systems. This mode does not include specialized hardware systems such as word processors, cash registers, and process control systems.

4. Software Products

Software products include user purchases of applications and systems packages for in-house computer systems. Included are lease and purchase expenditures, as well as expenditures for work performed by the vendor to implement and maintain the package at the user's sites. Expenditures for work performed by organizations other than the package vendor are counted in the category of professional services. There are several subcategories of software products, as indicated below and shown in detail in Exhibit B-2.

Application Products - Software that performs processing which services user functions. The products can be:

- *Cross-Industry Products* - Used in multiple industry applications as well as in federal government sectors. Examples are payroll, inventory control, and financial planning.

- *Industry-Specialized Products* - Used in a specific federal government sector, such as planning, resource utilization, aircraft flight planning, military personnel training, and others. May also include some products designed to work in an industry other than the federal government but applicable to specific government-performed commercial/industrial services, such as hospital information, vehicular fleet scheduling, electrical power generation and distribution, CAD/CAM, and others.

Systems Products - Software that enables the computer/communications systems to perform basic functions. These products include:

- *System Control Products* - Function during applications program execution to manage the computer system resources. Examples include operating systems, communication monitors, emulators, and spoolers.

• *Data Center Management Products* - Used by operations personnel to manage the computer systems resources and personnel more effectively. Examples include performance measurement, job accounting, computer operations scheduling, and utilities.

• *Applications Development Products* - Used to prepare applications for execution by assisting in designing, programming, testing, and related functions. Examples include languages, sorts, productivity aids, compilers, data dictionaries, data base management systems, report writers, project control systems, and retrieval systems.

5. Hardware and Hardware Systems

Hardware included all ADP and telecommunications equipment that can be separately acquired by the government with or without installation by the vendor and not acquired as part of an integrated system. For the purpose of this report, hardware is grouped in three major categories: peripherals, terminals, and hardware systems (processors).

Peripherals - Include all input, output, communications, and storage devices other than main memory that can be connected locally to the main processor and generally cannot be included in other categories such as terminals.

• *Input Devices* - Includes keyboards, numeric pads, card readers, light pens and track balls, tape readers, position and motion sensors, and analog-to-digital converters.

• *Output Devices* - Includes printers, CRTs, projection television screens, micrographics processors, digital graphics, and plotters.

• *Communication Devices* - Modems, encryption equipment, special interfaces, and error control.

• *Storage Devices* - Includes magnetic tape (reel, cartridge, and cassette), floppy and hard disks, drums, solid state (integrated circuits), and bubble and optical memories.

Terminals - Federal government systems use three types of terminals as described below.

• *User-Programmable* - Also called intelligent terminals, including:

  - Single-station or standalone.
  - Multi-station shared processor.
  - Teleprinter.
  - Remote batch.

EXHIBIT B-2

SOFTWARE PRODUCTS

Systems Software

Systems Control

- Access Control
- Communications Monitors
- Encription Systems
- Operating Systems
- Point-to-Point Control
- System Library Control
- Other

Data Center Management

- Capacity Management
- Computer Operations Scheduling
- Data Center Management
- Downtime/Repair Monitoring Management
- Job Accounting
- Performance Monitors
- Tape Management
- Utilities
- Other

Applications Development

Program Development and Production Tools

- Application Generators
- Assemblers
- Automatic Documentation
- Compilers
- Debugging Aids
- Languages
- Project Control and Management Systems
- Retrieval Systems
- Spreadsheet Systems
- Translators
- Others

Data Base Management Systems

- Data Base Management Systems
- Data Dictionaries
- Other

EXHIBIT B-2 (Cont.)

SOFTWARE PRODUCTS (Cont.)

Applications Software

Cross Industry

Accounting
• Accounts Payable
• Accounts Receivable
• Fixed Assets
• General Ledger
• Purchasing
• Other

Human Resources
• Benefits
• Payroll
• Personnel
• Training and Education
• Other

Information Analysis
• Budgeting
• Decision Support Systems
• Financial Planning
• Forecasting
• Modeling
• Other

Logistics Distribution
• Distribution Accounting
• Inventory
• Invoicing/Billing
• Mailing List
• Order Entry
• Procurement
• Other

Word Processing
• Document Generators
• Text Editors
• Word Processing
• Others

Graphics
• Character Graphics
• Line Graphics
• Picture Graphics
• Others

Other
• Administrative Services
• Executive Services
• Operations Services
• Project Control and Planning
• Scientific Engineering and Technical Support
• Other

Industry-Specific
• Education
• Federal Government
• Insurance
• Medical
• Process Manufacturing
• Services
• State and Local Government
• Transportation
• Utilities
• Other

- *Non-Programmable* - Also called "dumb" terminals, including:

  - Single-station.
  - Multi-station shared processor.
  - Teleprinter.

- *Limited Function* - Originally developed for specific needs, such as point-of-sale (POS), inventory data collections, controlled access, and other applications.

Hardware Systems - Includes all processors from microcomputers to supercomputers. Hardware systems may require type- or model-unique operating software to be functional, but this category excludes applications software and peripheral devices, other than main memory and processors or CPUs not provided as part of an integrated (turnkey) system.

- *Microcomputer* - Combines all of the CPU, memory, and peripheral functions of an 8-, 16-, or 32-bit computer on a chip in the form of:

  - Integrated circuit package.

  - Plug-in boards with more memory and peripheral circuits.

  - Console including keyboard and interfacing connectors.

  - Personal computer with at least one external storage device directly addressable by the CPU.

  - An embedded computer which may take a number of shapes or configurations.

- *Minicomputer* - Usually a 12-, 16-, or 32-bit computer which may be provided with limited applications software and support and may represent a portion of a complete large system.

  - Personal business computer.
  - Small laboratory computer.
  - Nodal computer in a distributed data network, remote data collection network, or connected to remote microcomputers.

- *Midicomputer* - Typically a 32- or 64-bit computer with extensive applications software and a number of peripherals in standalone or multiple-CPU configurations for business (administrative, personnel, and logistics) applications; also called a general purpose computer.

- *Large Computer* - Presently centered around storage controllers but likely to become bus-oriented and to consist of multiple processors or

parallel processors. Intended for structured mathematical and signal processing and typically used with general purpose, VonNeumann-type processors for system control.

- *Supercomputer* - High-powered processors with numerical processing throughput that is significantly greater than the fastest general purpose computers, with capacities in the 10-50 million floating point opera-tions per second (MFLOPS) range. Newer supercompu-ters, with burst modes approaching 300 MFLOPS, main storage size up to 10 million words, and on-line storage in the one-to-three gigabyte class, are la-beled Class IV to Class VII in agency long-range plans. Supercomput-ers fit in one of two categories:

  - *Real Time* - Generally used for signal processing in military applica-tions.

  - *Non-Real Time* - For scientific use in one of three configurations:

    * Parallel processors.
    * Pipeline processor.
    * Vector processor.

  - *Super( )computer* - Term applied to micro, mini, and large mainframe computers with performance substantially higher than attainable by VonNeuman architectures.

- *Embedded Computer* - Dedicated computer system designed and implemented as an integral part of a weapon, weapon system, or plat-form; critical to a military or intelligence mission such as command and control, cryptological activities, or intelligence activities. Characterized by military specifications (MIL SPEC) appearance and operation, limited but reprogrammable applications software, and permanent or semi-permanent interfaces. May vary in capacity from microcomputers to parallel processors computer systems.

6. Telecommunications

Networks - Electronic interconnections between sites or locations which may incorporate links between central computer sites and remote loca-tions and switching and/or regional data processing nodes. Network services typically are provided on a leased basis by a vendor to move data, voice, video, or textual information between locations. Networks can be categorized in several different ways.

- *Common Carrier Network* - A public access network, such as provided by AT&T, consisting of conventional voice-grade circuits and regular switching facilities accessed through dial-up calling with leased or user-owned modems for transfer rates between 150 and 1,200 baud.

- *Value-Added Network (VAN)* - Provided by vendors through common carrier or special-purpose transmission facilities with special features not available in the voice-grade switched public network. These include:

  - *Dedicated Network* - Also known as a private network, established and operated for one user or user organization using dedicated circuits to establish permanent connections between two or more stations.

  - *Packet Switching* - Real time network routing, transmitting, and receiving data in the form of addressed packets, each of which may be part of a message or include several messages without exclusive use of a network circuit by the transmitting and receiving stations.

  - *Message Switching* - Non-real time process for routing messages through network where a user message is received, stored, and forwarded from switch to switch through the network without an end-to-end circuit between sending and receiving stations; used primarily for data.

- *Local Area Network (LAN)* - Limited-access network between computing resources in a relatively small (but not necessarily contiguous) area, such as a building, complex of buildings, or buildings distributed within a metropolitan area. Uses one of two signalling methods.

  - *Baseband* - Signaling using digital waveforms on a single frequency band, usually at voice frequencies, and bandwidth, limited to a single sender at any given moment. When used for local area networks, typically implemented with TDM to permit multiple access.

  - *Broadband* - Transmission facilities that use frequencies greater than normal voice-grade, supported in local area networks with RF modems and AC signaling. Also known as wideband. Employs multiplexing techniques that increase carrier frequency between terminals to provide:

    ° Multiple channels through FDM or TDM.
    ° High-speed data transfer via parallel mode at rates of up to 96,000 baud.

Transmission Facilities - Includes wire, carrier, coaxial cable, microwave, optical fiber, satellites, cellular radio, and marine cable operating in one of two modes depending on the vendor and the distribution of the network.

• *Mode* - may be either:

- *Analog* - Transmission or signal with continuous waveform representation, typified by AT&T's predominantly voice-grade DDD network and most telephone operating company distribution systems.

- *Digital* - Transmission or signal using discontinuous, discrete quantities to represent data, which may be voice, data, record, video, or text, in binary form.

• *Media* - May be any of the following:

- *Wire* - Varies from earlier single-line teletype networks, to two-wire standard telephone (twisted pair), to four-wire full-duplex balanced lines.

- *Carrier* - A wave, pulse train, or other signal suitable for modulation by an information-bearing signal to be transmitted over a communications system, used in multiplexing applications to increase network capacity.

- *Coaxial Cable* - A cable consisting of an insulated central conductor surrounded by a cylindrical conductor with additional insulation on the outside and covered with an outer sheath used in HF (high frequency) and VHF (very high frequency), single frequency, or carrier-based systems; requires frequent reamplification (repeaters) to carry the signal any distance.

- *Microwave* - UHF (ultra-high frequency) multi-channel, point-to-point, repeated radio transmission, also capable of wide frequency channels.

- *Optical Fiber* - Local signal distribution systems employed in limited areas, using light-transmitting glass fibers and TDM for multi-channel applications.

- *Communications Satellites* - Synchronous earth-orbiting systems that provide point-to-point, two-way service over significant distances without intermediate amplification (repeaters), but requiring suitable groundstation facilities for up- and down-link operation.

- *Cellular Radio* - Network of fixed, low-powered two-way radios that are linked by a computer system to track mobile phone-data set units. Each radio serves a small area called a cell. The computer switches service connection to the mobile unit from cell to cell.

B

General Definitions

103/113 - Bell standard modem for low-speed transmission up to 300 bps, asynchronous, half or full duplex.

212 - Bell standard for medium-speed transmission at 1200 bps, asynchronous or synchronous, half or full duplex.

ASCII - American National Standard Code for Information Interchang—eight-bit code with seven data bits and one parity bit.

Asynchronous - Communications operation (such as transmission) without continuous timing signals. Synchronization is accomplished by appending signal elements to the data.

Bandwidth - Range of transmission frequencies that can be carried on a communications path; used as a measure of capacity.

Baud - Number of signal events (discrete conditions) per second. Typically used to measure modem or terminal transmission speed.

Benchmark - Method of testing proposed ADP system solutions for a specified set of functions (applications) employing simulated or real data inputs under simulated operating conditions.

BPS - Bits per second - also mbps and kbps, million bits per second and thousand bits per second, respectively.

BSC - IBM's binary synchronous communications data link protocol. First introduced in 1968 for use on point-to-point and multipoint communications channels. Frequently referenced as "bisync."

Byte - Usually equivalent to the storage required for one alphanumeric character (i.e., one letter or number).

CBX - Computerized Branch Exchange - a PABX based on a computer system, implying programmability and usually voice and data capabilities.

Central Processing Unit (CPU) - The arithmetic and control portion of a computer; i.e., the circuits controlling the interpretation and execution of computer instructions.

Centrex - Central office telephone services that permit local circuit switching without installation of customer premises equipment. Could be described as shared PBX service.

Circuit Switching - A process that, usually on demand, connects two or more network stations and permits exclusive circuit use until the connec-

tion is released; typical of the voice telephone network where a circuit is established between the caller and the called party.

CO - Central Office - local telco site for one or more exchanges.

CODEC - Coder/decoder, equivalent to modem for digital devices.

Constant Dollars - Growth forecasts in constant dollars make no allowance for inflation or recession. Dollar value based on the year of the forecast unless otherwise indicated.

Computer System - The combination of computing resources required to perform the designed functions and which may include one or more CPUs, machine room peripherals, storage systems, and/or applications software.

CPE - Customer Premises Equipment - DCE or DTE located at a customer site rather than at a carrier site such as the local telephone company CO. May include switchboards, PBX, data terminals, and telephone answering devices.

CSMA/CD - Carrier Sense Multiple Access/Collision Detect. Contention protocol used in local-area networks, typically with a multi-point configuration.

Current Dollars - Estimates or values expressed in current-year dollars which, for forecasts, would include an allowance for inflation.

Data Encryption Standard (DES) - 56-bit key, one-way encryption algorithm adopted by NBS in 1977, implemented through hardware ("S-boxes") or software. Designed by IBM with NSA guidance.

Datagram - A self-contained packet of information with a finite length that does not depend on the contents of preceding or following packets.

DCA - IBM's Document Content Architecture - protocols for specifying document (text) format which are consistent across a variety of hardware and software systems within IBM's DISOSS.

DCE - Data Circuit-terminating Equipment - interface hardware that couples DTE to a transmission circuit or channel by providing functions to establish, maintain, and terminate a connection, including signal conversion and coding.

DDCMP - Digital Data Communications Message Protocol - data link protocol used in Digital Equipment Company's DECNET.

DECNET - Digital Equipment Company's network architecture.

Dedicated Circuit - A permanently established network connection between two or more stations; contrast with switched circuit.

DEMS - Digital Electronic Message Service - nationwide common carrier digital networks which provide high-speed, end-to-end, two-way transmission of digitally-encoded information using the 10.6 GHz band.

DIA - IBM's Document Interchange Architecture - protocols for transfer of documents (text) between different hardware and software systems within IBM's DISOSS.

DISOSS - IBM's DIStributed Office Support System - office automation environment, based on DCA and DIA, which permits document (text) transfer between different hardware and software systems without requiring subsequent format or content revision.

Distributed Data Processing - The development of programmable intelligence in order to perform a data processing function where it can be accomplished most effectively through computers and terminals arranged in a telecommunications network adapted to the user's characteristics.

DTE - Data Terminal Equipment - hardware which is a data source or sink or both, such as video display terminals that convert user information into data for transmission and reconvert data signals into user information.

EBCDIC - Extended Binary Coded Decimal Interchange Code - eight-bit code typically used in IBM mainframe environments.

EFT - Electronic funds transfer.

Encryption - Electrical, code-based conversion of transmitted data to provide security and/or privacy of data between authorized access points.

End User - One who is using a product or service to accomplish his or her own functions. The end user may buy a system from the hardware supplier(s) and do his or her own programming, interfacing, and installation. Alternately, the end user may buy a turnkey system from a systems house or hardware integrator, or may buy a service from an in-house department or external vendor.

Engineering Change Notice (ECN) - Product changes to improve the product after it has been released to production.

Engineering Change Order (ECO) - The follow-up to ECNs - they include parts and a bill of materials to effect the change in the hardware.

Equipment Operators - Individuals operating computer control consoles and/or peripheral equipment (BLS definition).

Ethernet - Local area network developed by Xerox PARC using baseband signaling, CSMA/CD protocol, and coaxial cable to achieve a 10 mbps data rate.

Facsimile - Transmission and reception of data in graphic form, usually fixed images of documents, through scanning and conversion of a picture signal.

FDM - Frequency Division Multiplexing - a multiplexing method that permits multiple access by assigning different frequencies of the available bandwidth to different channels.

FEP - Front-End Processor - communications concentrator such as the IBM 3725 or COMTEN 3690 used to interface communications lines to host computers.

Field Engineer (FE) - Field engineer, customer engineer, serviceperson, and maintenance person are used interchangeably and refer to the individual who responds to a user's service call to repair a device or system.

Full-Duplex - Bi-directional communications with simultaneous two-way transmission.

General Purpose Computer System - A computer designed to handle a wide variety of problems. Includes machine room peripherals, systems software, and small business systems.

Half-Duplex - Bi-directional communications, but only in one direction at a time.

Hardware Integrator - Develops system interface electronics and controllers for the CPU, sensors, peripherals, and all other ancillary hardware components. The hardware integrator also may develop control system software in addition to installing the entire system at the end-user site.

HDLC - High-level Data Link Control.

Hertz - Number of signal oscillations (cycles) per second - abbreviated Hz.

IBM Token Ring - IBM's local area network using baseband signalling and operating at 4 mbps on twisted-pair copper wire. Actually a combination of star and ring topologies – IEEE 802.5-compatible.

IDN - Integrated Digital Network - digital switching and transmission; part of the evolution to ISDN.

Independent Suppliers - Suppliers of machine room peripherals - usually do not supply general purpose computer systems.

Information Processing - Data processing as a whole, including use of business and scientific computers.

Installed Base - Cumulative number or value (cost when new) of computers in use.

Interconnection - Physical linkage between devices on a network.

Interoperability - The capability to operate with other devices on a network. To be contrasted with interconnection, which merely guarantees a physical network interface.

ISDN - Integrated Services Digital Network - integrated voice and non-voice public network service which is completely digital. Not clearly defined through any existing standards although FCC and other federal agencies are participating in the development of CCITT recommendations.

Keypunch Operators - Individuals operating keypunch machines (similar in operation to electric typewriters) to transcribe data from source materials onto punch cards.

Lease Line - Permanent connection between two network stations. Also known as dedicated or non-switched line.

Machine Repairers - Individuals who install and periodically service computer systems.

Machine Room Peripherals - Peripheral equipment that is generally located close to the central processing unit.

Mainframe - The central processing unit (CPU or units in a parallel processor) of a computer that interprets and executes computer (software) instructions of 32 bits or more.

MAP - Manufacturing Automation Protocol - seven-layer communications standard for factory environments promoted by General Motors/ EDS. Adopts IEEE 802.2 and IEEE 802.4 standards plus OSI protocols for other layers of the architecture.

Mean Time to Repair - The mean of elapsed times from the arrival of the field engineer on the user's site until the device is repaired and returned to user service.

Mean Time to Respond - The mean of elapsed times from the user call for services and the arrival of the field engineer on the user's site.

Message - A communication intended to be read by a person. The quality of the received document need not be high, only readable. Graphic materials are not included.

MMFS - Manufacturing Messaging Format Standard - application-level protocol included within MAP.

Modem - A device that encodes information into electronically transmittable from (MOdulator) and restores it to original analog form (DEModulator).

NCP - Network Control Program - software used in IBM 3705/3725 FEPs for control of SNA networks.

Node - Connection point of three or more independent transmission points which may provide switching or data collection.

Off-Line - Pertaining to equipment or devices that can function without direct control of the central processing unit.

On-Line - Pertaining to equipment or devices under direct control of the central processing unit.

OSI - ISO reference model for Open Systems Interconnection - seven-layer architecture for application, presentation, session, transport, network, data link, and physical services and equipment.

OSI Application Layer - Layer 7, providing end-user applications services for data processing.

OSI Data Link Layer - Layer 2, providing transmission protocols, including frame management, link flow control, and link initiation/release.

OSI Network Layer - Layer 3, providing call establishment and clearing control through the network nodes.

OSI Physical Layer - Layer 1, providing the mechanical, electrical, functional, and procedural characteristics to establish, maintain, and release physical connections to the network.

OSI Presentation Layer - Layer 6, providing data formats and information such as data translation, data encoding/decoding, and command translation.

OSI Session Layer - Layer 5, establishes, maintains, and terminates logical connections for the transfer of data between processes.

OSI Transport Layer - Layer 4, providing end-to-end terminal control signals such as acknowledgements.

Overseas - Not within the geographical limits of the continental United States, Alaska, Hawaii, and U.S. possessions.

PABX - Private Automated Branch Exchange - hardware that provides automatic (electro-mechanical or electronic) local circuit switching on a customer's premises.

PAD - Packet Assembler-Disassembler - a device that enables DTE not equipped for packet switching operation to operate on a packet switched network.

PBX - Private Branch Exchange - hardware which provides local circuit switching on the customer premise.

PCM - Pulse-Code Modulation - modulation involving conversion of a waveform from analog to digital form through coding.

PDN - Public Data Network - a network established and operated by a recognized private operating agency, a telecommunications administration, or other agency for the specific purpose of providing data transmission services to the public.

Peripherals - Any unit of input/output equipment in a computer system, exclusive of the central processing unit.

PPM - Pulse Position Modulation.

Private Network - A network established and operated for one user or user organization.

Programmers - Persons mainly involved in designing, writing, and testing of computer software programs.

Protocols - The rules for communication system operation that must be followed if communication is to be effected. Protocols may govern portions of a network or service. In digital networks, protocols are digitally encoded as instructions to computerized equipment.

Public Network - A network established and operated for more than one user with shared access, usually available on a subscription basis. See related international definition of PDN.

Scientific Computer System - A computer system designed to process structured mathematics, such as Fast Fourier Transforms, and complex, highly redundant information, such as seismic data, sonar data, and radar, with large on-line memories and very high capacity throughput.

SDLC - Synchronous Data Link Control - IBM's data link control for SNA. Supports a subset of HDLC modes.

SDN - Software-Defined Network.

Security - Physical, electrical, and computer (digital) coding procedures to protect the contents of computer files and data transmission from inadvertent or unauthorized disclosure to meet the requirements of the Privacy Act and national classified information regulations.

Service Delivery Point - The location of the physical interface between a network and customer/user equipment.

Simplex - Undirectional communications.

Smart Box - A device for adapting existing DTE to new network standards such as OSI. Includes PADs and protocol convertors, for example.

SNA - Systems Network Architecture-seven-layer communications architecture designed by IBM. Layers correspond roughly but not exactly to OSI model.

Software - Computer programs.

Supplies - Includes materials associated with the use or operations of computer systems, such as printer paper, keypunch cards, disk packs, and tapes.

Switched Circuit - Temporary connection between two network stations established through dial-up procedures.

Synchronous - Communications operation with separate, continuous clocking at both sending and receiving stations.

Systems Analyst - Individual who analyzes problems to be converted to a programmable form for application to computer systems.

Systems House - Vendor that acquires, assembles, and integrates hardware and software into a total turnkey system to satisfy the data processing requirements of an end user. The vendor also may develop systems software products for license to end users. The systems house vendor does not manufacture mainframes.

Systems Integrator - Systems house vendor that develops systems interface electronics, applications software, and controllers for the CPU, peripherals, and ancillary subsystems that may have been provided by a contractor or the government (GFE). This vendor may either supervise or perform the installation and testing of the completed system.

TI - Bell System designation for 1.544 mbps carrier capable of handling 24 PCM voice channels.

TDM - Time Division Multiplexing - a multiplexing method that interleaves multiple transmissions on a single circuit by assigning a different time slot to each channel.

Token Passing - Local area network protocol which allows a station to transmit only when it has the "token," an empty slot on the carrier.

TOP - Technical Office Protocol - protocol developed by Boeing Computer Services to support administrative and office operations as complementary functions to factory automation implemented under MAP.

Turnkey System - System composed of hardware and software integrated into a total system designed to completely fulfill the processing requirements of a single application.

Twisted-Pair Cable - Communications cabling consisting of pairs of single-strand metallic electrical conductors, such as copper wires, typically used in building telephone wiring and some LANs.

Verification and Validation - Process for examining and testing applications and special systems software to verify that it operates on the target CPU and performs all of the functions specified by the user.

Voice-Grade - Circuit or signal in the 300-3300 Hz bandwidth typical of the public telephone system - nominally a 4 KHz user.

VTAM - Virtual Telecommunications Access Method - host-resident communications software for SNA networks.

C
Other Considerations

When questions arise as to the proper place to count certain user expenditures, INPUT addresses the questions from the user viewpoint. Expenditures then are categorized according to what the users perceive they are buying.

C

Appendix: Glossary of Federal Acronyms

The federal government's procurement language uses a combination of acronyms, phrases, and words that is complicated by different agency definitions and interpretations. The government also uses terms of accounting, business, economics, engineering, and law with new applications and technology.

Acronyms and contract terms that INPUT encountered most often in program documentation and interviews for this report are included here, but this glossary should not be considered all-inclusive. Federal procurement regulations (DAR, FPR, FAR, FIRMR, FPMR) and contract terms listed in RFIs, RFPs, and RFQs provide applicable terms and definitions.

Federal agency acronyms have been included to the extent they are employed in this report.

A

Acronyms

AAS	Automatic Addressing System.
AATMS	Advanced Air Traffic Management System.
ACO	Administrative Contracting Offices (DCAS).
ACS	Advanced Communications Satellite (formerly NASA 30/20 GHz Satellite Program).
ACT-1	Advanced Computer Techniques (Air Force).
Ada	DoD High-Order Language.
ADA	Airborne Data Acquisition.
ADL	Authorized Data List.
ADS	Automatic Digital Switches (DCS).
AFA	Air Force Association.
AFCEA	Armed Forces Communications Electronics Association.
AGE	Aerospace Ground Equipment.
AIP	Array Information Processing.

AIS	Automated Information System
AMPE	Automated Message Processing Equipment.
AMPS	Automated Message Processing System.
AMSL	Acquisition Management Systems List.
ANG	Army National Guard
AP(P)	Advance Procurement Plan.
Appropriation	Congressionally approved funding for authorized programs and activities of the Executive Branch.
APR	Agency Procurement Request.
ARPANET	DARPA network of scientific computers.
ASP	Aggregated Switch Procurement
ATLAS	Abbreviated Test Language for All Systems (for ATE-Automated Test Equipment).
Authorization	In the legislative process programs, staffing, and other routine activities must be approved by Oversight Committees before the Appropriations Committee will approve the money from the budget.
AUSA	Association of the U.S. Army.
AUTODIN	AUTOmatic DIgital Network of the Defense Communications System.
AUTOSEVOCOM	Automatic Secure Voice Communications Network
AUTOVON	AUTOmatic VOice Network of the Defense Communications System.
BA	Basic Agreement.
BAFO	Best And Final Offer.
Base level	Procurement, purchasing, and contracting at the military installation level.
BCA	Board of Contract Appeals.
Benchmark	Method of evaluating ability of a candidate computer system to meet user requirements.
Bid protest	Objection (in writing, before or after contract award) to some aspect of a solicitation by a valid bidder.
BML	Bidders Mailing List - qualified vendor information filed annually with federal agencies to automatically receive RFPs and RFQs in areas of claimed competence.
BOA	Basic Ordering Agreement.
B&P	Bid and Proposal - vendor activities in response to government solicitation/specific overhead allowance.
BPA	Blanked Purchase Agreement.
Budget	Federal Budget, proposed by the President and subject to Congressional review.
C^2	Command and Control.
C^3	Command, Control, and Communications.
C^4	Command, Control, Communications, and Computers.
C^3I	Command, Control, Communications, and Intelligence.
CAB	Contract Adjustment Board or Contract Appeals Board.
CADE	Computer-Aided Design and Engineering.
CADS	Computer-Assisted Display Systems.
CAIS	Computer-Assisted Instruction System.
CALS	Computer-Aided Automated Logistic System
CAPS	Command Automation Procurement Systems.

CAS	Contract Administration Services or Cost Accounting Standards.
CASB	Cost Accounting Standards Board.
CASP	Computer-Assisted Search Planning.
CBD	Commerce Business Daily - U.S. Department of Commerce publication listing government contract opportunities and awards.
CBO	Congressional Budget Office.
CCEP	Commercial Comsec Endorsement Program
CCDR	Contractor Cost Data Reporting.
CCN	Contract Change Notice.
CCPDS	Command Center Processing and Display Systems.
CCPO	Central Civilian Personnel Office.
CCTC	Command and Control Technical Center (JCS).
CDR	Critical Design Review.
CDRL	Contractor Data Requirement List.
CFE	Contractor-Furnished Equipment.
CFR	Code of Federal Regulations.
CICA	Competition in Contracting Act
CIG	Computerized Interactive Graphics.
CIR	Cost Information Reports.
CM	Configuration Management.
CMI	Computer-Managed Instruction.
CNI	Communications, Navigation, and Identification.
CO	Contracting Office, Contract Offices, or Change Order.
COC	Certificate of Competency (administered by the Small Business Administration).
COCO	Contractor-Owned, Contractor-Operated.
CODSIA	Council of Defense and Space Industry Associations.
COMSTAT	Communications Satellite Corporation.
CONUS	CONtinental United States.
COP	Capability Objective Package.
COTR	Contracting Officer's Technical Representative.
CP	Communications Processor.
CPAF	Cost-Plus-Award-Fee Contract.
CPFF	Cost-Plus-Fixed-Fee Contract.
CPIF	Cost-Plus-Incentive-Fee Contract.
CPR	Cost Performance Reports.
CPSR	Contractor Procurement System Review.
CR	Cost Reimbursement (Cost Plus Contract).
CSA	Combat or Computer Systems Architecture.
C/SCSC	Cost/Schedule Control System Criteria (also called "C-Spec").
CWAS	Contractor Weighted Average Share in Cost Risk.
DAL	Data Accession List.
DAR	Defense Acquisition Regulations.
DARPA	Defense Advanced Research Projects Agency.
DAS	Data Acquisition System.
DBHS	Data Base Handling System.
DCA	Defense Communications Agency.

DCAA	Defense Contract Audit Agency.
DCAS	Defense Contract Administration Services.
DCASR	DCAS Region.
DCC	Digital Control Computer.
DCP	Development Concept Paper (DoD).
DCS	Defense Communications System.
DCTN	Defense Commercial Telecommunications Network.
DDA	Dynamic Demand Assessment (Delta Modulation).
DDC	Defense Documentation Center.
DDL	Digital Data Link - A segment of a communications network used for data transmission in digital form.
DDN	Defense Data Network.
DDS	Dynamic Diagnostics System.
DECCO	DEfense Commercial Communications Office
DECEO	DEfense Communications Engineering Office
D&F	Determination and Findings - required documentation for approval of a negotiated procurement.
DIA	Defense Intelligence Agency.
DIF	Document Interchange Format, Navy-sponsored word processing standard.
DHHS	Department of Health and Human Services
DIDS	Defense Integrated Data Systems.
DISC	Defense Industrial Supply Center.
DLA	Defense Logistics Agency.
DMA	Defense Mapping Agency.
DNA	Defense Nuclear Agency.
DO	Delivery Order.
DOA	Department of Agriculture (also USDA).
DOC	Department of Commerce.
DOE	Department of Energy.
DOI	Department of Interior.
DOJ	Department of Justice.
DOS	Department of State.
DOT	Department of Transportation.
DPA	Delegation of Procurement Authority (granted by GSA under FPRs).
DPC	Defense Procurement Circular.
DQ	Definite Quantity Contract.
DQ/PL	Definite Quantity Price List Contract.
DR	Deficiency Report
DSCS	Defense Satellite Communication System
DSN	Defense Switched Network
DSP	Defense Support Program (WWMCCS).
DSS	Defense Supply Service.
DTC	Design-To-Cost.
ECP	Engineering Change Proposal.
ED	Department of Education.
EEO	Equal Employment Opportunity.
8(a) Set-Aside	Agency awards direct to Small Business Administration for direct placement with a socially/economically disadvantaged company.

EMC	Electro-Magnetic Compatibility.
EMCS	Energy Monitoring and Control System.
EO	Executive Order - Order issued by the President.
EOQ	Economic Ordering Quantity.
EPA	Economic Price Adjustment.
EPA	Environmental Protection Agency.
EPMR	Estimated Peak Monthly Requirement.
EPS	Emergency Procurement Service (GSA) or Emergency Power System.
EUC	End User Computing, especially in DoD.
FA	Formal Advertising.
FAC	Facility Contract.
FAR	Federal Acquisition Regulations.
FCA	Functional Configuration Audit.
FCC	Federal Communications Commission.
FCDC	Federal Contract Data Center.
FCRC	Federal Contract Research Center.
FDPC	Federal Data Processing Center.
FEDSIM	Federal (Computer) Simulation Center (GSA).
FEMA	Federal Emergency Management Agency.
FFP	Firm Fixed-Price Contract (also Lump Sum Contract).
FIPS	NBS Federal Information Processing Standard.
FIPS PUBS	FIPS Publications.
FIRMR	Federal Information Resource Management Regulations.
FMS	Foreign Military Sales.
FOC	Final Operating Capability.
FOIA	Freedom of Information Act.
FP	Fixed-Price Contract.
FP-L/H	Fixed-Price - Labor/Hour Contract.
FP-LOE	Fixed-Price - Level-Of-Effort Contract.
FPMR	Federal Property Management Regulations.
FPR	Federal Procurement Regulations.
FSC	Federal Supply Classification.
FSG	Federal Supply Group.
FSN	Federal Supply Number.
FSS	Federal Supply Schedule or Federal Supply Service (GSA).
FSTS	Federal Secure Telecommunications System.
FT Fund	A revolving fund, designated as the Federal Telecommunications Fund, used by GSA to pay for GSA-provided common-user services, specifically including the current FTS and proposed FTS 2000 services.
FTPS	Federal Telecommunications Standards Program administered by NCS; Standards are published by GSA.
FTS	Federal Telecommunications System.
FTS 2000	Proposed replacement for the Federal Telecommunications System.
FY	Fiscal Year.
FYDP	Five-Year Defense Plan.
GAO	General Accounting Office.
GFE	Government-Furnished Equipment.

GFM	Government-Furnished Material.
GFY	Government Fiscal Year (October to September).
GIDEP	Government-Industry Data Exchange Program.
GOCO	Government Owned - Contractor Operated.
GOGO	Government Owned - Government Operated.
GOSIP	Government Open Systems Interconnect Profile
GPO	Government Printing Office.
GPS	Global Positioning System.
GRH	Gramm-Rudman-Hollings Act (1985), also called Gramm-Rudman Deficit Control
GS	General Schedule.
GSA	General Services Administration.
GSBCA	General Services Administration Board of Contract Appeals.
HCFA	Health Care Financing Administration.
HHS	(Department of) Health and Human Services.
HPA	Head of Procuring Activity.
HSDP	High-Speed Data Processors.
HUD	(Department of) Housing and Urban Development.
ICA	Independent Cost Analysis.
ICAM	Integrated Computer-Aided Manufacturing.
ICE	Independent Cost Estimate.
ICP	Inventory Control Point.
ICST	Institute for Computer Sciences and Technology, National Bureau of Standards, Department of Commerce.
IDAMS	Image Display And Manipulation System.
IDEP	Interservice Data Exchange Program.
IDN	Integrated Data Network.
IFB	Invitation For Bids.
IOC	Initial Operating Capability.
IOI	Internal Operating Instructions.
IPS	Integrated Procurement System.
IQ	Indefinite Quantity Contract.
IR&D	Independent Research & Development.
IRM	Information Resource Manager.
IXS	Information Exchange System.
JOCIT	Jovial Compiler Implementation Tool.
JSIPS	Joint Systems Integration Planning Staff.
JSOP	Joint Strategic Objectives Plan.
JSOR	Joint Service Operational Requirement.
JUMPS	Joint Uniform Military Pay System.
LC	Letter Contract.
LCC	Life Cycle Costing.
LCMP	Life Cycle Management Procedures (DD7920.1).

LCMS	Life Cycle Management System.
L-H	Labor-Hour Contract.
LOI	Letter of Interest.
LRPE	Long-Range Procurement Estimate.
LRIRP	Long-Range Information Resource Plan.
MAISRC	Major Automated Information Systems Review Council (DoD).
MANTECH	MANufacturing TECHnology.
MAPS	Multiple Address Processing System.
MAP/TOP	Manufacturing Automation Protocol/Technical and Office Protocol.
MASC	Multiple Award Schedule Contract.
MDA	Multiplexed Data Accumulator.
MENS	Mission Element Need Statement or Mission Essential Need Statement (see DD-5000.1 Major Systems Acquisition).
MILSCAP	Military Standard Contract Administration Procedures.
MIL SPEC	Military Specification.
MIL STD	Military Standard.
MIPR	Military Interdepartmental Purchase Request.
MOD	Modification.
MOL	Maximum Ordering Limit (Federal Supply Service).
MPC	Military Procurement Code.
MYP	Multi-Year Procurement.
NARDIC	Navy Research and Development Information Center.
NASA	National Aeronautics and Space Administration.
NBS	National Bureau of Standards.
NCMA	National Contract Management Association.
NCS	National Communications System; responsible for setting U.S. Government standards administered by GSA; also holds primary responsibility for emergency communications planning.
NICRAD	Navy-Industry Cooperative Research and Development.
NIP	Notice of Intent to Purchase.
NMCS	National Military Command System.
NSA	National Security Agency.
NSEP	National Security and Emergency Preparedness.
NSF	National Science Foundation.
NSIA	National Security Industrial Association.
NTIA	National Telecommunications and Information Administration of the Department of Commerce; replaced the Office of Telecommunications Policy in 1970 as planner and coordinator for government communications programs; primarily responsible for radio.
NTIS	National Technical Information Service.
Obligation	"Earmarking" of specific funding for a contract from committed agency funds.
OCS	Office of Contract Settlement.
OFCC	Office of Federal Contract Compliance.
Off-Site	Services to be provided near but not in government facilities.
OFMP	Office of Federal Management Policy (GSA).

OFPP	Office of Federal Procurement Policy.
OIRM	Office of Information Resources Management.
O&M	Operations & Maintenance.
OMB	Office of Management and Budget.
O,M&R	Operations, Maintenance, and Readiness.
On-Site	Services to be performed on a government installation or in a specified building.
OPM	Office of Procurement Management (GSA) or Office of Personnel Management.
Options	Sole-source additions to the base contract for services or goods to be exercised at the government's discretion.
OSHA	Occupational Safety and Health Act.
OSI	Open System Interconnect
OSP	Offshore Procurement.
OTA	Office of Technology Assessment (Congress).
Out-Year	Proposed funding for fiscal years beyond the Budget Year (next fiscal year).
P-I	FY Defense Production Budget.
P3I	Pre-Planned Product Improvement (program in DoD).
PAR	Procurement Authorization Request or Procurement Action Report.
PAS	Pre-Award Survey.
PASS	Procurement Automated Source System.
PCO	Procurement Contracting Officer.
PDA	Principal Development Agency.
PDM	Program Decision Memorandum.
PDR	Preliminary Design Review.
PIR	Procurement Information Reporting.
PME	Performance Monitoring Equipment.
PMP	Purchase Management Plan.
PO	Purchase Order or Program Office.
POM	Program Objective Memorandum.
POSIX	Portable Open System Interconnect Exchange.
POTS	Purchase of Telephone Systems.
PPBS	Planning, Programming, Budgeting System.
PR	Purchase Request or Procurement Requisition.
PRA	Paperwork Reduction Act.
PS	Performance Specification - alternative to a Statement of Work, when work to be performed can be clearly specified.
QA	Quality Assurance.
QAO	Quality Assurance Office.
QMCS	Quality Monitoring and Control System (DoD software).
QMR	Qualitative Material Requirement (Army).
QPL	Qualified Products List.
QRC	Quick Reaction Capability.
QRI	Quick Reaction Inquiry.
R-I	FY Defense RDT&E Budget.
RAM	Reliability, Availability, and Maintainability.
RC	Requirements Contract.

R&D	Research and Development.
RDA	Research, Development, and Acquisition.
RDD	Required Delivery Date.
RD&E	Research, Development, and Engineering.
RDF	Rapid Deployment Force.
RDT&E	Research, Development, Test, and Engineering.
RFI	Request For Information.
RFP	Request For Proposal.
RFQ	Request For Quotation.
RFTP	Request For Technical Proposals (Two-Step).
ROC	Required Operational Capability.
ROI	Return On Investment.
RTAS	Real Time Analysis System.
RTDS	Real Time Display System.
SA	Supplemental Agreement.
SBA	Small Business Administration.
SB Set-Aside	Small Business Set-Aside contract opportunities with bidders limited to certified small businesses.
SCA	Service Contract Act (1964 as amended).
SCN	Specification Change Notice.
SDN	Secure Data Network.
SEC	Securities and Exchange Commission.
SE&I	Systems Engineering and Integration.
SETA	Systems Engineering/Technical Assistance.
SETS	Systems Engineering/Technical Support.
SIBAC	Simplified Intragovernmental Billing and Collection System.
SIMP	Systems Integration Master Plan.
SIOP	Single Integrated Operations Plan.
SNAP	Shipboard Nontactical ADP Program.
Sole Source	Contract award without competition.
Solicitation	Invitation to submit a bid.
SOR	Specific Operational Requirement.
SOW	Statement of Work.
SSA	Source Selection Authority (DoD).
SSAC	Source Selection Advisory Council.
SSEB	Source Selection Evaluation Board.
SSO	Source Selection Official (NASA).
STINFO	Scientific and Technical INFOrmation Program - Air Force/NASA.
STU	Secure Telephone Unit.
SWO	Stop-Work Order.
Synopsis	Brief Description of contract opportunity in CBD after D&F and before release of solicitation.
TA/AS	Technical Assistance/Analysis Services.
TCP/IP	Transmission Control Protocol/Internet Protocol.

TEMPEST	Studies, inspections, and tests of unintentional electromagnetic radiation from computer, communication, command, and control equipment that may cause unauthorized disclosure of information; usually applied to DoD and security agency testing programs.
TILO	Technical and Industrial Liason Office—Qualified Requirement Information Program - Army.
TM	Time and Materials contract.
TOA	Total Obligational Authority (Defense).
TOD	Technical Objective Document.
TR	Temporary Regulation (added to FPR, FAR).
TRACE	Total Risk Assessing Cost Estimate.
TRCO	Technical Representative of the Contracting Offices.
TREAS	Department of Treasury.
TRP	Technical Resources Plan.
TSP	GSA's Teleprocessing Services Program.
TVA	Tennessee Valley Authority.
UCAS	Uniform Cost Accounting System.
USA	U.S. Army.
USAF	U.S. Air Force.
USCG	U.S. Coast Guard.
USMC	U.S. Marine Corps.
USN	U.S. Navy.
U.S.C.	United States Code.
USPS	United States Postal Service.
USRRB	United States Railroad Retirement Board.
VA	Veterans Administration.
VE	Value Engineering.
VHSIC	Very High Speed Integrated Circuits.
VIABLE	Vertical Installation Automation BaseLine (Army).
VICI	Voice Input Code Identifier.
WBS	Work Breakdown Structure.
WGM	Weighted Guidelines Method.
WIN	WWMCCS Intercomputer Network.
WITS	Washington Interagency Telecommunications System.
WIS	WWMCCS Information Systems.
WS	Work Statement - Offerer's description of the work to be done (proposal or contract).
WWMCCS	World-Wide Military Command and Control System.

B

General and Industry

ADAPSO	Association of Data Processing Service Organization, now the Computer Software and Services Industry Association.
ADP	Automatic Data Processing.
ADPE	Automatic Data Processing Equipment.
ANSI	American National Standards Institute.
BOC	BELL Operating Company.
CAD	Computer-Aided Design.
CAM	Computer-Aided Manufacturing.
CBEMA	Computer and Business Equipment Manufacturers Association.
CCIA	Computers and Communications Industry Association.
CCITT	Comite Consultaif Internationale de Telegraphique et Telephonique; Committee of the International Telecommunication Union.
COBOL	COmmon Business-Oriented Language.
COS	Corporation for Open Systems
CPU	Central Processor Unit.
DMBS	Data Base Management System.
DRAM	Dynamic Random Access Memory
EIA	Electronic Industries Association.
EPROM	Erasable Programmable Read-Only-Memory.
IEEE	Institute of Electrical and Electronics Engineers.
ISDN	Integrated Services Digital Networks.
ISO	International Organization for Standardization; voluntary international standards organization and member of CCITT.
ITU	International Telecommunication Union.
LSI	Large-Scale Integration.
MFJ	Modified Final Judgement.
PROM	Programmable Read-Only Memory.
RBOC	Regional Bell Operating Company.
UNIX	AT&T Proprietary Operating System.
UPS	Uninterruptable Power Source.
VAR	Value Added Retailer.
VLSI	Very Large Scale Integration.
WORM	Write-Once-Read-Many-Times.

D

Appendix: Policies, Regulations, and Standards

A

OMB Circulars

A-11	Preparation and Submission of Budget Estimates.
A-49	Use of Management and Operating Contracts.
A-71	Responsibilities for the Administration and Management of Automatic Data Processing Activities.
A-76	Policies for Acquiring Commercial or Industrial Products and Services Needed by the Government.
A-109	Major Systems Acquisitions.
A-120	Guidelines for the Use of Consulting Services.
A-121	Cost Accounting, Cost Recovery, and Integrated Sharing of Data Processing Facilities.
A-123	Internal Control Systems.
A-127	Financial Management Systems.
A-130	Management of Federal Information Resources.
A-131	Value Engineering

B

GSA Publications

The FIRMR as published by GSA is the primary regulation for use by federal agencies in the management, acquisition, and use of both ADP and telecommunications information resources.

C

DoD Directives

DD-5000.1	Major System Acquisitions.
DD-5000.2	Major System Acquisition Process.
DD-5000.11	DoD Data Elements and Data Codes Standardization Program.
DD-5000.31	Policy and Procedures for the Management and Control of High-Order Languages and Mandate for Use of Ada Language for all DoDMission-Critical Applications.
DD-5000.35	Defense Acquisition Regulatory Systems.

DD-5200.1	DoD Information Security Program.
DD-5200.28	Security Requirements for Automatic Data Processing (ADP) Systems.
DD-5200.28-M	Manual of Techniques and Procedures for Implementing, Deactivating, Testing, and Evaluating Secure Resource Sharing ADP Systems.
DD-7920.1	Life Cycle Management of Automated Information Systems (AIS).
DD-7920.2	Major Automated Information Systems Approval Process.
DD-7935	Automated Data Systems (ADS) Documentation.

D

Standards

ADCCP	Advanced Data Communications Control Procedures; ANSI Standard X3.66 of 1979; also NBS FIPS 71.
CCITT G.711	International PCM Standard.
CCITT T.0	International Standard for Classification of Facsimile Apparatus for Document Transmission Over Telephone-Type Circuits.
DEA-1	Proposed ISO Standard for Data Encryption Based on the NBS DES.
EIA RS-170	Monochrome Video Standard.
EIA RS-170A	Color Video Standard.
EIA RS-464	EIA PBX Standards.
EIA RS-465	Facsimile Standard; Procedures for Document Transmission in the General Switched Telephone Network.
EIA RS-232-C	EIA DCE to DTE Interface Standard Using a 25-Pin Connector; Similar to CCITT V-24.
EIA RS-449	New EIA Standard DTE to DCE Interface which Replaces RS-232-C.
FED-STD 1000	Proposed Federal Standard for Adoption of the Full OSI Reference Model.
FED-STD 1026	Federal Data Encryption Standard (DES) Adopted in 1983; also FIPS 46.
FED-STD 1041	Equivalent to FIPS 100.
FED-STD 1061	Group II Facsimile Standard (1981).
FED-STD 1062	Federal Standard for Group III Facsimile; Equivalent to EIA RS-465.
FED-STD 1063	Federal Facsimile Standard; Equivalent to EIA RS-466.
FED- STDs 1005, 1005A-1008	Federal Standards for DCE Coding and Modulation.
FIPS 46	NBS Data Encryption Standard (DES).
FIPS 81	DES Modes of Operation.
FIPS 100	NBS Standard for Packet-Switched Networks; Subset of 1980 CCITT X.25.
FIPS 107	NBS Standard for Local Area Networks, Similar to IEEE 802.2 and 802.3.
IEEE 802.2	OSI-Compatible IEEE Standard for Data-Link Control in Local Area Networks.
IEEE 802.3	Local Area Network Standard Similar to Ethernet.
IEEE 802.4	OSI-Compatible Standard for Token-Bus Local Area Networks.
IEEE 802.5	Local Area Networks Standard for Token-Ring Networks.

MIL-STD-188-114C	Physical interface protocol similar to RS-232 and RS-449.
MIL-STD-1750A	Embedded system microchip architecture specification.
MIL-STD-1777	IP-Internet Protocol.
MIL-STD-1778	TCP - Transmission Control Protocol.
MIL-STD-1780	File Transfer Protocol.
MIL-STD-1781	Simple Mail Transfer Protocol (Electronic Mail).
MIL-STD-1782	TELNET - Virtual Terminal Protocol.
MIL-STD-1815A	Standard for the Ada Programming Language, February 1983.
MIL-STD 2167	Defense System Software Development.
X.21	CCITT Standard for Interface between DTE and DCE for Synchronous Operation on Public Data Networks.
X.25	CCITT Standard for Interface between DTE and DCE for Terminals Operating in the Packet Mode on Public Data Networks.
X.75	CCITT Standard for Links that Interface Different Packet Networks.
X.400	ISO Application-Level Standard for the Electronic Transfer of Messages (Electronic Mail).

E

Appendix: Related INPUT Reports

A
Annual Market Analyses

U.S. Information Services Vertical Markets, 1987.

U.S. Information Services Cross-Industry Markets, 1987.

Procurement Analysis Reports, GFY 1988-1992.

B
Industry Surveys

U.S. Information Services Industry, 1987.

Eighteenth Annual ADAPSO Survey of the Computer Services Industry - 1984.

Directory of Leading U.S. Information Services Vendors.

C
Market Reports

Federal Software Market, 1987-1992.

Federal Systems Integration Market, 1987-1992.

Federal ADP Facilities Management Market, 1987-1992.

Federal Government Processing Services Market, 1987-1992.

U.S. Professional Services Market, 1986-1991.

Federal Office Information Systems Market, 1986-1991.

Departmental Systems and Software Directions, 1986.

IBM Operating Systems Strategies, 1986.

Network Services Directions, 1986.

CD ROM: Vendors and Services, 1986.

Professional Services Market Directions, 1986.

Commercial Systems Integration Opportunities and Challenges, 1986.

U.S. EDI Software Markets, 1987.

European Professional Services Market Trends and Opportunities, 1987-1992.

On-line Data Base Market, 1987-1992.

U.S. Processing/Network Services, 1987-1992.

F

Appendix: Professional Services—Agency Questionnaire

For the purposes of this survey, we have defined "Professional Services"—"for ADP" as follows.

Consulting Services - Information systems and/or services management consulting, program assistance (technical and/or management) feasibility analysis, and cost/effectiveness trade-off studies.

Education/Training Services - Products and/or services related to ISS for the user, including CAI (computer-aided instruction), CBE (computer-based education), and vendor instruction of user personnel in operations, programming and maintenance.

Operation and Maintenance - (Also referred to as O&M) - Contractor (vendor) - staffed support of client ADP/telecommunications equipment on-site (on government property), in cases where the vendor does not manage the complete facility and the equipment and initial software suite may not have been provided by the vendor.

Maintenance (Hardware and/or Software) - Vendor-furnished services provided after installation and acceptance by the user. These services may be part of a warranty or may be separately contracted; services may be provided by resident or on-call personnel of the vendor.

Programming and Analysis - Including system design, contract or custom programming, code conversion, independent verification and validation (also called "IV&V"), benchmarking.

Systems Integration - Services associated with systems design, integration of computing components, installation and government acceptance of ADP/telecommunications systems under projects called SE&I or SETA. Integration services may be provided with related engineering activities (such as SE&I (Systems Engineering and Integration) or SETA (Systems Engineering and Technical Assistance).

QU: 1 Have you used any of the following professional services categories within the past year? Proposed future use?

	Yes	No	Future Yes	Future No	Why?
Consulting	___	___	___	___	_____
Education/Training	___	___	___	___	_____
Hardware Maintenance	___	___	___	___	_____
Software Maintenance	___	___	___	___	_____
Programming and Analysis	___	___	___	___	_____
Systems Integration	___	___	___	___	_____
Operation and Maintenance	___	___	___	___	_____

QU: 2 What percent of your total professional services budget is currently spent on each of following categories?

	Percent Spent Now
Consulting	_____
Education/Training	_____
Hardware Maintenance	_____
Software Maintenance	_____
Programming and Analysis	_____
Systems Integration	_____
Operations and Maintenance	_____
Other	_____
Total	_____

QU: 3 What is your annual expenditure for professional services?

_____

QU: 4 Do you anticipate any change in the amount of professional services you will use in the next two to five years?

____ Yes ____ No
(If Yes, proceed to question 4a) (If no, proceed to question 5)

QU: 4a In which of the following categories do you expect either an increase or decrease in the next two to five years, and can you estimate by what percent?

	Increase	Decrease	No Change	Percent Change
Consulting	_____	_____	_____	_____
Education/Training	_____	_____	_____	_____
Hardware Maintenance	_____	_____	_____	_____
Software Maintenance	_____	_____	_____	_____
Programming and Analysis	_____	_____	_____	_____
Systems Integration	_____	_____	_____	_____
Operations and Maintenance	_____	_____	_____	_____

QU: 5 What types of applications have been contracted out to professional services vendors in the past year?

_____

_____

QU: 5a What additional applications do you foresee in the next five years?

_____

_____

QU: 6 In your opinion, is your agency going to continue to utilize custom software inits computer operations? (software development).

____ Yes ____ No

QU: 6a How many of these applications are equivalent to commercial software applications and could be accomplished by minor modifications to a commercial software package?

_____

QU: 6b How many custom software applications are unique to the government agency only and do not have a commercial equivalent available for use?

_____

Is your agency using or planning to use commercial or customized Data Base Management Systems (DBMS)?

_____ Yes   _____ No

For what types of applications? _____

QU: 7   Which computer language standards are in effect now or might be applied in the future to your agency's use of professional services?
Instructions: For each standard use by agency, give which professional services it is used for and whether it is used currently or for the future.

	Language Standard	Professional Service Applications Use	Current Use	Future
1.				
2.				
3.				

QU: 8   What types of education and training requirements does your agency have?

_____

_____

QU: 8a Have they increased or decreased over the last five years?

_____ Increase   _____ Decrease

QU: 8b Will they increase _____, decrease _____, or stay about the same _____ over the next five years?

QU: 8c Where will the funding be obtained or diverted to for supporting these educational requirements?

_____

QU: 9   How would you rank the importance of the following professional services vendor characteristics in winning a bid?
1 - Definitely not important
2 - Somewhat important
3 - Important
4 - Very important
5 - Crucial

	Characteristics	Rank
1.	Application Functional Experience	1 2 3 4 5
2.	Integration Experience	1 2 3 4 5
3.	Staff Experience	1 2 3 4 5
4.	Hardware Experience	1 2 3 4 5
5.	Software Development Experience	1 2 3 4 5
6.	Support Functions	1 2 3 4 5
7.	Federal Contract Experience	1 2 3 4 5
8.	Agency Experience	1 2 3 4 5
9.	Price	1 2 3 4 5
10.	Other	1 2 3 4 5

QU: 10   On a scale of 1 to 5, with 5 being the most satisfied, how would you rank your level of satisfaction with professional services vendors in the past regarding:

	Characteristics	Rank
a.	Quality of Work	1 2 3 4 5
b.	Quantity of Work	1 2 3 4 5
c.	Responsiveness to Agency Needs	1 2 3 4 5
d.	Project Management	1 2 3 4 5
e.	Development Visibility	1 2 3 4 5
f.	Delivery Schedule(s)	1 2 3 4 5
g.	Cost	1 2 3 4 5

QU: 11   What type of contract does your agency prefer for professional services?

     ____ Cost Plus   ____ Fixed Price   ____ Mix of Both

     ____ Other (specify) _____

QU: 11a   Are you presently using Multiple Award Basic Ordering Agreements? _____

     Which Services? _____

QU: 12   When a professional services contract for design, programming and analysis iscompleted, do you usually transfer continued support in-house or leave support with the contractor?

     ____ In-House ____ Out of House

QU: 13   Do you plan to convert any professional services contracts to in-house?

     ____ Yes   ____ No

QU: 13a   Why? _____

QU: 14   Do you plan to convert any in-house support functions to outside contractor support?

     ____ Yes   ____ No

QU: 14a   Why? _____

QU: 14b   Which applications? _____

_____

QU: 15   Could you identify those factors (non-technical) that would have the greatest impact on your agency's professional services plans?

_____

_____

QU: 15a   Have any Federal Personnel Policies regarding ADP staff had an influence on your use of professional services?

_____

_____

QU: 16   What technological changes might alter the way your agency accomplishes its professional services plans?

_____

_____

QU: 17   What would you like to see vendors do in the next two to five years to make their services more valuable?

_____

_____

QU: 18   Which type of vendor or organization appears more desirable for performing professional services?

____ Mainframe Manufacturer

____ Systems House (Non-Hardware)

____ Not-for-Profit

____ Software Manufacturer

____ Other (specify) _____

QU: 18a Why? _____

_____

QU: 19   How have vendor "teaming" arrangements served to satisfy the federal agency needs for professional services?

_____

_____

G

Appendix: Professional Services—Industry Questionnaire

For the purposes of this survey, we have defined "Professional Services"—"for ADP" as follows.

Consulting Services - Information systems and/or services management consulting, program assistance (technical and/or management) feasibility analysis, and cost/effectiveness trade-off studies.

Education/Training Services - Products and/or services related to ISS for the user, including CAI (computer-aided instruction), CBE (computer-based education), and vendor instruction of user personnel in operations, programming and maintenance.

Operation and Maintenance - (Also referred to as O&M) - Contractor (vendor) - staffed support of client ADP/telecommunications equipment on-site (on government property), in cases where the vendor does not manage the complete facility and the equipment and initial software suite may not have been provided by the vendor.

Maintenance (Hardware and/or Software) - Vendor-furnished services provided after installation and acceptance by the user. These services may be part of a warranty or may be separately contracted; services may be provided by resident or on-call personnel of the vendor.

Programming and Analysis - Including system design, contract or custom programming, code conversion, independent verification and validation (also called "IV&V"), benchmarking.

Systems Integration - Services associated with systems design, integration of computing components, installation and government acceptance of ADP/telecommunications systems under projects called SE&I or SETA. Integration services may be provided with related engineering activities (such as SE&I (Systems Engineering and Integration) or SETA (Systems Engineering and Technical Assistance).

QU: 1a   Does your company now provide or plan to provide professional services to the federal government?

    ____ Yes   ____ No

QU: 1b   What types of systems or services do you now provide or plan to provide?

	Yes	No	Future Yes	Future No	Why?
Consulting	____	____	____	____	_____
Education/Training	____	____	____	____	_____
Hardware Maintenance	____	____	____	____	_____
Software Maintenance	____	____	____	____	_____
Programming and Analysis	____	____	____	____	_____
Systems Integration	____	____	____	____	_____
Operation and Maintenance	____	____	____	____	_____

QU: 1c   What other categories, if any, of professional services would you add to our list?

_____

_____

What are your current and future activities in those categories?

_____

_____

QU: 2   What percent of your total professional services business was done with the federal government last year?

_____

QU: 3   What percent of your federal professional services revenue was generated in each of those categories last year?

	Percent Revenue Last Year
Consulting	_____
Education/Training	_____
Hardware Maintenance	_____
Software Maintenance	_____
Programming and Analysis	_____
Systems Integration	_____
Operations and Maintenance	_____
Other	_____

QU: 3a What was your company's total professional services revenue in dollars last fiscal year - both commercial and government?

_____

QU: 3b According to your company's total professional services revenue, do you rank your company within the top 10 professional services vendors serving the federal market?

_____ Yes _____ No

QU: 3c What is your approximate rank? _____

QU: 3d What was your company's total corporate revenue in dollars for your most recent fiscal year? $ _____ FY _____

QU: 4 Do you anticipate any change in the amount of professional services you will provide to the federal government in the next two to five years?

_____ Yes _____ No

QU: 4a (If Yes) In which of the following categories do you expect either an increase or decrease in the next two to five years, and can you estimate by what percent? This is federal government only.

	Increase	Decrease	No Change	Percent Change
Consulting	_____	_____	_____	_____
Education/Training	_____	_____	_____	_____

QU: 4a (continued)

        Hardware Maintenance _____ _____ _____ _____

        Software Maintenance _____ _____ _____ _____

        Programming and _____ _____ _____ _____
        Analysis

        Systems Integration _____ _____ _____ _____

        Operations and _____ _____ _____ _____
        Maintenance

QU: 5   In your opinion, what technical factors will increase or decrease federal government spending on professional services in the next two to five years?

        _____

        _____

QU: 6a   In your opinion, which agencies provide the most attractive opportunities for your company in providing professional services to the government?

        _____

        _____

QU: 6b   Do you provide professional services to any of these agencies under Multiple Award Basic Ordering agreements?

        _____

        Which Agencies? _____

QU: 7   Are you now qualified or do you plan to become qualified in Ada programming?
        _____ Qualified Now   _____ Planning To Be

QU: 8   What differences do you see between commercial markets and the federal market for your products and services?

        _____

        _____

QU: 9   What industry trends will affect the federal professional services market?

_____

_____

Why? _____
_____

QU: 10   Do you expect the government to increase its SE&I and SETA contracting over the next five years?

_____

_____

Why? _____
_____

QU: 11   Which of the following contract types do you expect to dominate the federal professional services market over the next five years?

_____ Cost Plus   _____ Fixed Price   _____ Mix of Both

_____ Other (specify) _____

Why? _____
_____

QU: 12   What are the implications of these contracting trends on professional services vendors, particularly as it relates to pricing approaches?

_____

_____

QU: 13   What effect will the government's growing use of packages software have on the professional services market?

_____

_____

QU: 14   When you complete a professional services contract with the government for design, programming and analysis, is follow-on support usually transferred in-house or left with you or another vendor?

     _____ In-House

     _____ Out-of-House Self

     _____ Out-of-House Other

QU: 15   Have you ever lost any professional services contracts to government in-house staffs?

     _____ Yes   _____ No

QU: 15a   Why?

     _____

     _____

QU: 15b   What types of applications?

     _____

     _____

QU: 16   Have you ever acquired a contract for support functions which were previously done in-house by the government?

     _____ Yes   _____ No

QU: 17   Could you identify those non-technical factors that would have the greatest impact on government professional services acquisitions?

     _____

     _____

QU: 18   How would you rank the importance of the following professional services vendor characteristics in winning a bid?

     1 - Definitely not important
     2 - Somewhat important
     3 - Important
     4 - Very important
     5 - Crucial

	Characteristics	Rank
1.	Application Functional Experience	1 2 3 4 5
2.	Integration Experience	1 2 3 4 5
3.	Staff Experience	1 2 3 4 5
4.	Hardware Experience	1 2 3 4 5
5.	Software Development Experience	1 2 3 4 5
6.	Support Functions	1 2 3 4 5
7.	Federal Contract Experience	1 2 3 4 5
8.	Agency Experience	1 2 3 4 5
9.	Price	1 2 3 4 5
10.	Other	1 2 3 4 5

QU: 19 On a scale of 1 to 5, with 5 being the most satisfied, how would you rank the government's level of satisfaction with professional services vendors in the past regarding:

	Characteristics	Rank
a.	Quality of Work	1 2 3 4 5
b.	Quantity of Work	1 2 3 4 5
c.	Responsiveness to Agency Needs	1 2 3 4 5
d.	Project Management	1 2 3 4 5
e.	Development Visibility	1 2 3 4 5
f.	Delivery Schedule(s)	1 2 3 4 5
g.	Cost	1 2 3 4 5

QU: 20 What do you believe vendors need to do over the next five years to make their products and professional services more valuable to the federal government?

_____

_____

Additional Comments:

_____

_____

_____

VIII

About INPUT

Company Profile

Founded in 1974, INPUT has become a leading international planning services firm. Clients include over 200 of the world's largest and most technically advanced companies.

Through market research, technology forecasting, and market/competitive analysis, INPUT supports client management in making informed decisions. Continuing services are provided to users and vendors of computers, communications, office systems, and information services. Clients receive reports, presentations, access to data on which analyses are based, and continuous client support.

INPUT is a service company. Through advisory/research planning services, multiclient studies, and proprietary consulting, INPUT serves clients' ongoing planning information needs.

Staff Credentials

INPUT's professional staff have backgrounds in marketing, planning, information processing, and market research in some of the world's leading organizations. Many of INPUT's professional staff have held executive positions in the following business sectors:

- Computer systems
- Software
- Turnkey systems
- Field service
  (customer service)

- Processing services
- Professional services
- Data processing
- Network services
- Communications

Educational backgrounds include both technical and business specializations, and many INPUT staff hold advanced degrees.

| Domestic and European Planning Services | INPUT offers eight basic information services: six covering U.S. information industry markets and two covering European information industry markets. |

Domestic and European Planning Services

INPUT offers eight basic information services: six covering U.S. information industry markets and two covering European information industry markets.

1. Market Analysis Service (MAS)

Provides up-to-date U.S. information services market analyses, five-year forecasts, trend analyses and sound recommendations for action. MAPS is designed to satisfy the planning and marketing requirements of current and potential information services vendors.

2. Company Analysis Service (CAS)

Is a comprehensive reference service covering more than 4,000 U.S. information services vendor organizations. CAS is often used for competitive analysis and pre-screening of acquisition and joint venture candidates.

3. Electronic Data Interchange Planning Service (EDIPS)

Focusing on what is fast becoming a major computer/communications market opportunity, INPUT's EDIPS keeps you informed. Through monthly newsletters, timely news flashes, comprehensive studies, joint user/vendor conference, and telephone inquiry privileges you will be informed and stay informed about the events and issues impacting this burgeoning market.

4. Federal Information Systems and Services Program (FISSP)

Presents highly specific information on U.S. federal government procurement practices, identifies information services vendor opportunities, and provides guidance from INPUT's experienced Washington professionals to help clients maximize sales effectiveness in the government marketplace.

5. Information Systems Program (ISP)

Is designed for executives of small, medium, and large information systems organizations and provides crucial information for planning, procurement, and management decision making. The program examines new service offerings, technological advances, user requirements for systems and services, IS spending patterns, and more. ISP is widely used by both user and vendor organizations.

6. Customer Service Program U.S. (CSP)

Provides customer service organization management with data and analyses needed for marketing, technical, financial, and organizational planning.

The program pinpoints user perceptions of service received, presents vendor-by-vendor service comparisons and analyzes and forecasts service markets for large systems, small systems, telecommunications systems, software maintenance, and third-party maintenance.

7. Western European Customer Service Program (CSPE)

Parallels the U.S. Customer Service Program, dealing with comparable issues in European markets.

8. Western European Information Services Program (ISPE)

Analyzes and forecasts European information services markets. Clients receive timely planning information through research-based studies, conferences, client meetings, and continuous client support.

Customized Planning Services Available

In addition to standard continuous information programs, INPUT will work with you to develop and provide a customized planning service which meets your unique requirements.

An Effective Combination

INPUT'S Executive Planning Services are built upon an effective combination of research-based studies, client meetings, informative conferences, and continuous client support. Each service is designed to deliver the information you need in the form most useful to you, the client. Executive Planning Services are composed of *varied combinations of the following* products and services:

Research-Based Studies
Following a proven research methodology, INPUT conducts major research studies throughout each program year.   1987 projects include:

√   Commercial Systems Integration Implementations
√   On-Line Data Base Markets, 1987-1992
√   Network Integration
√   Future DBMS Markets
√   Economics of Distributed Data Processing
√   Guide to EDI Implementation
√   Chargeback Systems for IS Organizations
√   Office Productivity
√   Distributed Data Base Management
√   DEC vs. IBM 1987-1992
√   Third-Party Maintenance User Requirements & Market Analysis
√   Large- and Small-Systems Service Market Analysis
√   Customer Service Pricing
√   Automated Field Service Delivery

√   Software Maintenance Markets
√   Third-Party Maintenance Competitive Analysis
    ...and more!

Information Service Industry Reports
INPUT's Executive Planning Services address specific issues, competitive
environment and user expenditures relative to:

Software   Professional Services
Processing/Network Services   Turnkey Systems
Systems Integration   Small-Systems Service
Telecommunications Service   Third-Party Maintenance
Office Systems   Large-Systems Service

Industry Market Reports
Detailed analysis of market trends, forces driving the markets, problems, op-
portunities and user expenditures are available for the following segments:

Banking/Finance   Accounting
Discrete Manufacturing   Education/Training
Distribution   Engineering/Scientific
Education   Human Resources
Federal/State and Local Government Planning and Analysis
Insurance   Systems Software
Medical   Utility Processing
Process Manufacturing   Value-Added Networks
Service Industry   Other Cross-Industry Markets
Telecommunications   Transportation
Utilities

Hotline: Client Inquiry Services
Daily, weekly, monthly, quarterly, and annual client planning questions are
answered quickly and completely through use of INPUT's Client Hotline.
Clients may call any INPUT office (California, New Jersey, Washington
D.C., or London) during business hours or they may call a unique voicemail
service to place questions after hours. This effective Hotline service is the
cornerstone of every INPUT Executive Planning Service.

The Information Center
One of the largest and most complete collections of information services
industry data, the Information Center houses literally thousands of up-to-
date files on vendors, industry markets, applications, current/emerging
technologies, and more. Clients have complete access to the Information
Center. In addition to the information contained in its files, the center

maintains an 18-month inventory of over 130 major trade publications, vendor consultant manuals, economic data, government publications, and a variety of important industry documents.

Access to INPUT Professional Staff
Direct access to our staff, many of whom have more than 20 years of experience in the information industry, provides you continuous research and planning support. When you buy INPUT, you buy experience and knowledge.

Annual Client Conference
Each year, you can attend INPUT's Annual Client Conference. This three-day event addresses the status and future of the information services industry, the competitive environment, important industry trends potentially affecting your business, the impact of new technology and new service offerings, and more.

You will attend with top executives from many of the industry's leading, fastest-growing, and most successful vendor companies, and with top Information Systems (IS) managers from some of the world's most sophisticated user organizations.

On-Site Presentation by INPUT Executive
Many of INPUT's Planning Services offer an informative presentation at your site. Covering the year's research, this session is held in the fourth quarter of each calendar year.

Proprietary Research Service

INPUT conducts proprietary research that meets the unique requirements of an individual client. INPUT's custom research is effectively used:

For Business Planning
Planning for new products, planning for business startups, planning expansion of an existing business or product line—each plan requires reliable information and analysis to support major decisions. INPUT's dedicated efforts and custom research expertise in business planning ensure comprehensive identification and analysis of the many factors affecting the final decision.

For Acquisition Planning
Successful acquisition and divestiture of information services companies requires reliable information. Through constant contact with information services vendor organizations, continuous tracking of company size, growth, financials, and management "chemistry," INPUT can provide the valuable insight and analysis you need to select the most suitable candidates.

For The Total Acquisition Process

INPUT has the credentials, the database of company information and, most importantly, the contacts to assist you with the total acquisition and/or partnering relationship processes:

√ Due Diligence
√ Schedules and Introduction
√ Establish Set of Criteria & Definitions
√ Retainer and Fee-Based
√ Active Search

For Competitive Analysis

Knowing marketing and sales tactics, product capabilities, strategic objectives, competitive posture, and strengths and weaknesses of your competition is as critical as knowing your own. The career experience of its professionals, coupled with its collection and maintenance of current financial, strategic, tactical and operational information about more than 4,000 active companies, uniquely qualifies INPUT to provide the best competitive information available today.

For Market and Product Analysis

Developing new products and entering new markets involves considerable investment and risk. INPUT regularly conducts research for clients to identify product requirements, market dynamics, and market growth.

More About INPUT...

• More than 5,000 organizations, worldwide, have charted business direction based on INPUT's research and analysis.

• Many clients invest more than $50,000 each year to receive INPUT's recommendations and planning information.

• INPUT conducts proprietary research, regularly, for some of the largest companies in the world.

• INPUT has developed and maintains one of the most complete information industry libraries in the world (access is granted to all INPUT clients).

• INPUT clients control an estimated 70% of the total information industry market.

• INPUT analyses and forecasts are founded upon years of practical experience, knowledge of historical industry performance, continual tracking of day-to-day industry events, knowledge of user and vendor plans, and business savvy.

• INPUT analysts accurately predicted the growth of the information services market—at a time when most research organizations deemed it a transient market. INPUT predicted the growth of the microcomputer market in 1980 and accurately forecasted its slowdown in 1984.

For More Information . . .
INPUT offers products and services that can improve productivity, and ultimately profit in your firm. Please give us a call today. Our representatives will be happy to send you further information on our services or to arrange a formal presentation at your offices.

For details on delivery schedules, client service entitlement, or Hotline support simply call your nearest INPUT office; our customer support group will be available to answer your questions.

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